GEOTECHNICAL INVESTIGATION CITY OF HOUSTON WATER LINE REPLACEMENT IN KICKERILLO AREA WBS NO. S-000035-0185-3 HOUSTON, TEXAS

Submitted by:

GEOTEST ENGINEERING, INC.

Houston, Texas

REPORT NO. 1140194601

November 14, 2013

Key Map Nos. 488 H, M and 489 E, J



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Mr. David Warner, P.E. Jones and Carter, Inc. 8701 New Trails Drive, Suite 200 The Woodlands, Texas 77381

Reference:

Geotechnical Investigation

City of Houston Water Line Replacement in

Kickerillo Area

WBS No. S-000035-0185-3

Houston, Texas

Dear Mr. Warner:

We are pleased to present our final geotechnical report for the above referenced project. A draft report was submitted to you on June 25, 2013. This final report supersede all previously submitted reports, transmittals etc. for the referenced project. This study was authorized by Jones and Carter, Inc. Subconsultant Agreement dated April 19, 2013 by accepting Geotest Engineering, Inc. (Geotest) Proposal No. 1140304799 dated April 8, 2013.

We appreciate this opportunity to be of service to you. If you have any questions regarding the report, or if we can be of further service to you, please call us.

Very truly yours,

GEOTEST ENGINEERING, INC.

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EXECUTIVE SUMMARY

A geotechnical investigation was performed for the design and construction of the proposed water line replacement in the Kickerillo Area in Houston, Texas. The project calls for the design and construction of water lines replacement in Kickerillo Area in Houston, Texas. The proposed water lines replacement in Kickerillo Area is approximately 33,270 linear feet with new waterline size ranging from 4 to 8 inches in diameter. The anticipated maximum depth of new water lines range from 6 to 15 feet. The proposed water lines will generally be constructed by pipe augering. The locations of the augering pits are not known at this time. New pavement design will not be required for this project.

The purposes of this study were to evaluate soil and groundwater conditions and to provide geotechnical recommendations for the proposed water lines replacement. This investigation included drilling and sampling fifty (50) borings to depths ranging from 13 to 22 feet, installing piezometers in four (4) existing borings, performing laboratory tests on soil samples recovered from the borings, performing engineering analyses and developing geotechnical recommendations and preparing a geotechnical report.

The principal findings and conclusions developed from this investigation are as follows:

• The subsurface soil beneath pavement as encountered in borings GB-1 through GB-50 along various streets in the project area consists of predominantly cohesive soils to the explored depths of 13 to 22 feet except in borings GB-9, GB-11, GB-12, GB-14, GB-18, GB-32 and GB-35. In borings GB-9, GB-11, GB-12, GB-14, GB-18, GB-32 and GB-35, the subsurface soil beneath pavement consists of cohesive with intermittent or underlain by cohesionless soil to the explored boring depths of 13 to 22 feet. The cohesive soils consist of dark gray, gray, brown, yellowish brown and reddish brown medium stiff to hard Sandy Lean Clay, Silty Clay, Lean Clay with sand, Lean Clay, Fat Clay with sand and Fat Clay. The cohesionless soil consists of medium dense to very dense gray, reddish brown Silty Sand, Silt w/sand, Sandy Silt and Clayey Silt. In borings GB-13, GB-46 and GB-48, fill material consisting of medium stiff to stiff gray, dark gray, brown and reddish

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brown Fat Clay, and medium dense brown Silty Sand with grass roots, calcareous and ferrous nodules were encountered to depths of 6 to 8 feet below the pavement.

- It is our understanding that, based on the available information provided by City of Houston, Long Point fault crosses the project area. Hence, a Phase I Fault Study will be performed in accordance with Section 11.09 of the City of Houston Design Manual and will be submitted with a final geotechnical report.
- Groundwater was encountered in borings GB-9, GB-11, GB-12, GB-13, GB-14, GB-18 and GB-22 to depths ranging from 11.0 to 14.0 feet during drilling. The groundwater level, measured 15 minutes after water was first encountered, ranged from 7.0 to 11.7 feet in these borings. No groundwater was encountered in any other borings drilled for this study including the boring converted into piezometer during the field investigation. In piezometer borings GB-1P, GB-22P and GB-49P, the water level measured at 30 days ranges from 5.7 to 11.3 feet.
- The existing paving as obtained in the soil borings GB-1 through GB-50, predominantly consists of rigid pavement consisting of 5.25 to 9.0 of concrete over 0 to 3 inches of sand and shell base. In borings GB-28 through GB-30 and GB-38 through GB-50, the existing pavement consists of 10.5 to 15.5 inches of asphalt over 0.0 to 4.0 inches of sand and shell base.
- All excavation operations should be carried out in accordance with OSHA standards and the City of Houston Standard Specifications.
- Recommendations for installation of waterlines by trenchless method (Pipe and Auger Casing) and other associated construction are included in Sections 5.2 and 5.3 of this report.
- Geotechnical parameters for design of piping system thrust restraint are provided in Section 5.4 of this report.

1.0 INTRODUCTION

1.1 General

The City of Houston selected Montgomery and Barnes, Inc., currently Jones and Carter, Inc. to perform engineering services for design and construction of water line replacement in Kickerillo Area in Houston, Texas. Montgomery and Barnes, Inc., currently Jones and Carter, Inc. retained Geotest Engineering, Inc. as part of the design team to perform geotechnical investigation for the above project.

1.2 Authorization

This study was authorized by Jones and Carter, Inc. Subconsultant Agreement on April 19, 2013 by accepting Geotest Engineering, Inc. (Geotest) Proposal No. 1140304799 dated April 8, 2013.

1.3 Location and Description of Project

The project is located in Kickerillo Area in Houston, Texas. The project area is bounded by Buffalo Bayou to the south, North Kirkwood Road to the east, Memorial Drive to the north and Winter Oaks Drive to the west, within the Key Map Page and Grid 488 H, M and 489 E, J.

The proposed water line improvements in the Kickerillo Area are shown on Figure 1, Vicinity Map.

1.4 Purpose and Scope

The purposes of this study were to evaluate soil and groundwater conditions and to provide geotechnical recommendations for the design and construction of the proposed water line replacement in Kickerillo area. The scope of this investigation consisted of the following:

• Coring the existing concrete pavement at thirty-five (35) locations to access the subsurface soils below the pavement.

- Drilling and sampling fifty (50) borings to depths ranging from 13 feet to 22 feet.
- Converting four (4) borings into piezometers to monitor long term ground water level.
- Performing appropriate laboratory tests in accordance with ASTM methods on selected samples to develop engineering properties of the soil.
- Performing engineering analyses in accordance with the City of Houston Design Manual (July 2012) to develop geotechnical recommendations for the design and construction of the proposed water line replacement in Kickerillo area.
- Preparing a geotechnical report that will include all field data, laboratory test data and geotechnical recommendations.
- Preparing a separate trench safety report for open excavation for auger pits.

2.0 FIELD INVESTIGATION

2.1 General

After obtaining the utilities clearance of proposed fifty (50) marked borings in the field, existing concrete pavement was cored at thirty-five (35) locations and borings were drilled to the explored depths at all locations including asphalt pavement boring locations. The borings were drilled utilizing a truck mounted drilling rig. Traffic control devices and personnel were utilized during coring and drilling to maintain safety of drill crew and people driving in the streets. All the drilling and sampling were performed in accordance with appropriate ASTM procedures. It should be noted that after completion of the field work (May 2013) the water line depths was changed (June 2013) by the design consultant. At boring location GB-16, the depth of boring does not meet City of Houston design criteria, hence deepening of boring GB-16 is recommended during the design phase.

2.2 Geotechnical Borings

Subsurface conditions were explored by drilling and sampling soil borings (designated as GB-1 through GB-50) to depths ranging from 13 to 22 feet. The approximate boring locations are shown on Figures 2.1 through 2.3, Plan of Borings. Survey information (Northing and Easting coordinates and ground surface elevation) of completed borings was provided to us by Jones and Carter, Inc. The survey information of completed borings is summarized in Table 1.

The existing concrete pavement was cored at thirty-five (35) boring locations to provide access to the subsurface soils in the borings. Borings GB-9 and GB-11 were extended an additional 5 feet due to silt was encountered at the bottom of the boring. In general, samples were obtained continuously to the termination depths of 13, 14, 15, 17, 18 and 22 feet, respectively. Cohesive soils were obtained with a 3-inch thin-walled tube sampler in general accordance with ASTM Method D 1587. Cohesionless soil samples were obtained with a 2-inch split spoon barrel in accordance with ASTM Method D 1586. Each sample was removed from the sampler in the field, carefully examined and then logged by an experienced soils technician. Suitable portions of each sample were sealed and packaged for transportation to Geotest's Laboratory. The shear strength of cohesive soil samples

was estimated using a pocket penetrometer in the field. Driving resistances for the split-barrel samples were recorded as "Blows per Foot" on the boring logs. All the borings, except the ones converted to piezometers, were grouted with cement-bentonite grout after completion of drilling and obtaining water level measurements.

Detailed descriptions of the soils encountered in the borings are given on the boring logs presented on Figures A-1 through A-50 in Appendix A. A key to symbols and terms used on boring logs is given on Figure A-51 in Appendix A.

2.3 Piezometer Installation

During the field investigation, a piezometer was installed in the open borehole of borings GB-1, GB-22, GB-36 and GB-49. The location of the piezometers, designated as GB-1P, GB-22P, GB-36P and GB-49P, is shown on Figures 2.1 through 2.3, Plan of Borings. The piezometer installation report showing the details of the construction of the piezometers are provided on Figures A-52 through A-55 in Appendix A.

The piezometers were abandoned in place after taking the final water level readings. The piezometer abandonment reports are presented in Appendix C.

3.0 LABORATORY TESTING

The laboratory testing program was designed to evaluate the pertinent physical properties and shear strength characteristics of the subsurface soils. Classification tests were performed on selected samples to aid in soil classification. All the tests were performed in accordance with ASTM Standards.

Undrained shear strengths of selected cohesive samples were measured by unconsolidated undrained (UU) triaxial tests (ASTM D 2850). The results of the UU triaxial compression tests are plotted on the boring logs as solid squares. The shear strength of cohesive samples was measured in the field with a calibrated hand pocket penetrometer and also in the laboratory with a Torvane. The shear strength values obtained from the penetrometer and Torvane are plotted on the boring logs as open circles and triangles, respectively.

Measurements of moisture content and dry unit weight were taken for each UU triaxial test sample. Moisture content (ASTM D 2216) measurements were also made on other samples to define the moisture profile at each boring location. The liquid and plastic limit tests (ASTM D 4318), sieve analysis (ASTM D422) and percent passing No. 200 sieves (ASTM D 1140) were performed on appropriate samples.

The result of all tests are tabulated or summarized on the boring logs presented on Figures A-1 through A-50 in Appendix A. The summary of laboratory tests is also presented in a tabular form on Figures B-1 through B-50 in Appendix B. The grain size distribution curves are presented on Figures B-51 and B-52 in Appendix B.

The laboratory Corrosivity tests including pH, Chloride, Sulphate and resistivity tests were performed on selected samples. The test results are presented in Appendix D and also given below.

Boring No.	Sample No.	Depth, ft.	pH	Resistivity (ohm-c)	Chloride (mg/kg)	Sulphate (mg/kg)
GB-2	S#5	8-10	7.43	1480	55.3	<10.0
GB-5	S#5	8-10	8.83	1300	65.8	<10.0
GB-6	S#4	6-8	9.35	3050	65.8	12.9
GB-7	S#4	6-8	8.17	1690	242	<10.0
GB-9	S#4	6-8	8.39	2280	46.0	<10.0
GB-13	S#6B	10-12	8.67	1640	135	31.5
GB-16	S#5	8-10	9.31	1340	20.7	<10.0
GB-17	S#7	12-14	9.91	1730	66.0	19.7
GB-22	S#7	12-14	9.29	2400	43.2	24.5
GB-24	S#6	10-12	9.15	1000	17.4	<10.0
GB-34	S#4	6-8	8.35	2230	41.8	13.6
GB-38	S#6	10-12	8.79	1870	20.9	<10.0
GB-41	S#6	10-12	8.02	996	19.5	132
GB-42	S#6	10-12	9.00	1700	34.9	14.0
GB-43	S#7	10-12	9.67	1140	38.7	10.7
GB-46	S#5	8-10	8.69	944	19.1	10.6
GB-48	S#7	12-14	7.94	941	29.2	10.7
GB-50	S#4	6-8	8.4	1630	19.5	<9.8

Based on the corrosivity test results, the degree of corrosivity of the surface soils is negligible in terms of pH, mild to corrosive in terms of soils resistivity, below threshold in terms of chloride concentration and negligible in terms of sulfate concentration. Protective measures such as cathodical protection or cement mortar coating will be required for ductile iron pipe at areas near borings GB-24, GB-41, GB-46 and GB-48. At borings GB-2, GB-5, GB-7, GB-13, GB-16, GB-17, GB-38, GB-42, GB-43 and GB-50, due to moderately corrosive nature of the soils in terms of resistivity, protective measures such as cathodical protection or cement north coating may be required for ductile iron pipe. The details of the protective measures should be performed by program corrosion specialist.

4.0 SUBSURFACE CONDITIONS

4.1 Geology

The project area lies in the Beaumont Formation. The clays and sands of the Beaumont Formation are over-consolidated as a result of desiccation from frequent rising and lowering of the sea level and the groundwater table. Consequently, clays of this formation have moderate to high shear strength and relatively low compressibility. The sands of the Beaumont Formation are typically very fine and often silty. Further, there is occasional evidence in the Houston area of the occurrence of cemented material (sandstone and siltstone) deposits within the Beaumont Formation.

4.2 General Fault Information

It is our understanding that, based on the available information provided by City of Houston, Long Point fault crosses the project area. Hence, a Phase I Fault Study will be performed in accordance with Section 11.09 of the City of Houston Design Manual and will be submitted separately in a supplemental report.

4.3 Existing Paving

The existing paving as obtained in the soil borings GB-1 through GB-50, predominantly consists of rigid pavement consisting of 5.25 to 9.0 of concrete over 0 to 3 inches of sand and shell base. In borings GB-28 through GB-30 and GB-38 through GB-50, the existing pavement consists of 10.5 to 15.5 inches of asphalt over 0.0 to 4.0 inches of sand and shell base.

The details of the existing pavement thickness at each of the boring locations are summarized below:

Boring Nos.	Asphalt Thickness (in.)	Base Thickness (in.)	Concrete Thickness (in.)	Subbase Thickness (in.)	Total (in.)
GB-1 (GB-1P)	(111.)	(111.)	5.5	(111.)	5.5
GB-2			5.5		5.5
GB-3			5.5		5.5
GB-4			5.5		5.5
GB-5			6.25		6.25
GB-6			6.0		6.0
GB-7			6.0		6.0
GB-8			5.5		5.5
GB-9			7.0		7.0
GB-10			6.0		6.0
GB-11			9.0		9.0
GB-12			9.0		9.0
GB-13			7.75		7.75
GB-14			8.75		8.75
GB-15			6.0		6.0
GB-16			8.5		8.5
GB-17			6.0		6.0
GB-18			7.5		7.5
GB-19			5.25		5.25
GB-20			9.0		9.0
GB-21			6.75		6.75
GB-22 (GB-22P)			9.0		9.0
GB-23			6.0		6.0
GB-24			7.5		7.5
GB-25			7.0		7.0
GB-26			6.75		6.75
GB-27			6.0		6.0
GB-28			6.0		6.0
GB-29	15.5				15.5
GB-30	11.5				11.5
GB-31			6.0		6.0
GB-32			7.0		7.0
GB-33			6.0		6.0
GB-34			6.0		6.0
GB-35			6.5	3.0	9.5
GB-36 (GB-36P)			5.5	1.0	6.5
GB-37			6.5	3.0	9.5
GB-38	12.0				12.0
GB-39	12.0				12.0
GB-40	12.0				12.0

Boring Nos.	Asphalt Thickness (in.)	Base Thickness (in.)	Concrete Thickness (in.)	Subbase Thickness (in.)	Total (in.)
GB-41	14.0	(111.)	(111.)	(111.)	14.0
GB-42	12.0				12.0
GB-42	12.0	4.0			16.0
	+	4.0			12.0
GB-44	12.0				
GB-45	12.0				12.0
GB-46	10.5				10.5
GB-47	12.0				12.0
GB-48	12.0				12.0
GB-49 (GB-49P)	10.5	1.5			12.0
GB-50	12.5				12.5

4.4 Soils Stratigraphy

Based on the subsurface soils encountered in the boreholes, seventeen (17) boring log profiles were developed and are presented on Figures 3.1 through 3.17. To the left of each boring shown on the profile is an indication of the consistency of each stratum. More than one consistency for an individual stratum indicates that the consistency is different at different depths within the stratum. For cohesive soils, consistency is related to the undrained shear strength of the soil. For cohesionless soils, the relative density is related to standard penetration resistance of the soil. To the right of each boring shown on the profile is the overall classification of the soil contained within each stratum. The symbols and abbreviations used on the boring log profile are given on Figure 4. The soil classification is based on ASTM Standards.

The subsurface soils beneath pavement as encountered in borings GB-1 through GB-50 and as shown in boring log profiles 3.1 through 3.17 along various streets in the project area are summarized below:

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-1, GB-2, GB-3,	Chadbourne Drive	14 to 15	The subsurface soil beneath the pavement along
GB-4 and GB-5			Chadbourne Drive as shown on the boring log
			profile presented on Figure 3.1, consists of stiff
			to hard brown and gray and yellowish brown
			and gray and reddish brown and gray Sandy
			Lean Clay, Lean Clay with sand, Lean Clay and
			Fat Clay to the explored depths of 14 to 15 feet.
			The Fat Clay is of high to very high plasticity
			with liquid limits ranging from 52 to 71 and
			plasticity indices ranging from 31 to 45. The
			Lean Clay, Lean Clay with sand and Sandy
			Lean Clay is of high plasticity with liquid limits
			ranging from 42 to 46 and plasticity indices
			ranging from 26 to 28. The percent fines
			(percent passing No. 200 sieve) of Fat Clay and
			Lean Clay ranges from 87 to 98 percent. The
			percent fines of Lean Clay with sand ranges
			from 71 to 79 percent. The percent fines of
			Sandy Lean Clay is about 70 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-6 through GB-10	Broadgreen Drive	15 to 22	The subsurface soil beneath the pavement along Broadgreen Drive as shown on the boring log profile presented on Figure 3.2, consists of medium stiff to hard, dark gray, gray, brown, yellowish brown and reddish brown and gray Sandy Lean Clay, Silty Clay, Lean Clay with sand, Lean Clay, Fat Clay and Fat Clay with sand to the explored depths of 15 to 22 feet. A stratum of gray Silty Sand was encountered between the depths of 12 and 13 feet in boring GB-9 and stratum of medium dense reddish brown clayey silt was encountered between depths of 15 and 17 feet in the same boring GB-9.
			The Fat Clay and Fat Clay with sand is of high to very high plasticity with liquid limits ranging from 53 to 75 and plasticity indices ranging from 31 to 47. The Lean Clay, Lean Clay with sand and Sandy Lean Clay are of high plasticity with liquid limits ranging from 46 to 49 and plasticity indices ranging from 25 to 30. The Silty Clay is of low plasticity with liquid limit of 27 and plasticity of 6. The percent fines of Fat Clay and Lean Clay ranges from 90 to 91 percent. The percent fines of Fat Clay w/sand and Lean Clay with sand ranges from 76 to 82 percent. The percent fines of Sandy Lean Clay is about 50 percent. The percent fines of Silty Clay is about 91 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-11 through GB-14	Cindywood Lane	14 to 19	The subsurface soil beneath the pavement
			along Cindywood Lane as shown on the
			boring log profile presented on Figure 3.3,
			consists of medium stiff to hard, gray and
			yellowish brown, gray and reddish brown,
			Silty Clay, Lean Clay with sand, Lean Clay,
			Fat Clay and Fat Clay with sand to the
			explored depths of 14 to 19 feet. A stratum of
			reddish brown and gray Clayey Silt was
			encountered between the depths of 10 and 12
			feet and 12 and 15 feet in boring GB-14 and
			between depths of 12 and 14 feet in boring
			GB-12. A stratum of medium dense to very
			dense gray and reddish brown Sandy Silt was
			encountered between depths of 12 and 19 feet in boring GB-11. Fill material consisting
			medium stiff to stiff gray, brown fat clay with
			calcareous and ferrous nodules was
			encountered to depth of 6 feet in boring
			GB-13.
			The Fat Clay and Fat Clay w/sand is of high
			plasticity with liquid limits ranging from 54 to
			64 and plasticity indices ranging from 32 to
			39. The Lean Clay with sand and Lean Clay
			are of low to high plasticity with liquid limits
			ranging from 28 to 43 and plasticity indices
			ranging from 9 to 27. The percent fines of Fat
			Clay and Lean Clay ranges from 93 to 100
			percent. The percent fines of Lean Clay with
			sand and Fat Clay w/sand ranges from 71 to 84
			percent. The percent fines of Sandy Silt is
			about 66 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-15 through GB-19	Carolcrest Drive	14 to 17	The subsurface soil beneath the pavement along Carolcrest Drive as shown on the boring log profiles presented on Figure 3.4, consists of medium stiff to hard, dark gray, gray and brown, yellowish brown and gray, reddish brown and gray, Sandy Lean Clay, Lean Clay, Lean Clay with sand and Fat Clay, to the explored depths of 14 to 17 feet. A stratum of medium dense reddish brown Silt w/sand was encountered between the depths of 14 and 16 feet in boring GB-18. The Fat Clay is of high plasticity with liquid limit of about 50 and plasticity index of about 29. The Lean Clay, Lean Clay with sand and Sandy Lean Clay is of high plasticity with liquid limits ranging from 42 to 47 and plasticity indices ranging from 26 to 27. The percent fines of Fat Clay and Lean Clay ranges from 86 to 92 percent. The percent fines of Lean Clay with sand ranges from 73 to 79 percent. The percent fines of Sandy Lean Clay is about 62 percent. The percent fines of Silt w/sand is about 72 percent.
GB-20 through GB-22	Kellywood Lane	13 to 18	The subsurface soil beneath the pavement along Kellywood Lane as shown on the boring log profile presented on Figure 3.5, consists of medium stiff to hard stiff, dark gray, gray, brown, yellowish brown and reddish brown Sandy Lean Clay, Lean Clay w/sand, Fat Clay w/sand and Fat Clay to the explored depths of 13 to 18 feet. The Fat Clay and Fat Clay w/sand is of high plasticity with liquid limits ranging from 51 to 59 and plasticity indices ranging from 31 to 36. The Lean Clay w/sand and Lean Clay is of medium plasticity with liquid limit ranging from 29 to 30 and plasticity indices ranging from 12 to 15. The percent fines of Fat Clay ranges from 99 to 100 percent. The percent fines of Lean Clay w/sand and Fat Clay w/sand ranges from 76 to 83 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-23 and GB-4	Rainwood Drive	13 and 14	The subsurface soil beneath the pavement along Rainwood Drive and near the intersection of Rainwood Drive and Chadbourne Drive as shown on the boring log profile presented on Figure 3.6, consists of stiff to hard, dark gray, yellowish brown and gray and reddish brown Lean Clay w/sand and Fat Clay to the explored depth of 13 and 14 feet.
			The Fat Clay is of high plasticity with liquid limits ranging from 63 to 67 and plasticity indices ranging from 39 to 42. The Lean Clay w/sand is about high plasticity with a liquid limit of about 46 and plasticity index of about 26. The percent fines of Fat Clay ranges from 88 to 99 percent. The percent fines of Lean Clay w/sand is about 79 percent.
GB-24 and GB-9	Clear Springs Drive	14 and 22	The subsurface soil beneath the pavement along Clear Spring Drive and near the intersection of Clear Spring Drive with Broadgreen Drive as shown on the boring log profile presented on Figure 3.7, consists of medium stiff to hard, gray and brown, yellowish brown and gray and reddish brown, Sandy Lean Clay, Silty Clay and Fat Clay to the explored depths of 14 to 22 feet. A stratum of gray Silty Sand was encountered between depths of 10 and 13 feet and medium dense reddish brown Clayey Silt was encountered between the depths of 15 and 17 feet in boring GB-9.
			The Fat Clay is of high plasticity with liquid limits ranging from 57 to 62 and plasticity indices ranging from 34 to 36. The Sandy Lean Clay is of high plasticity with liquid limit of about 41 and plasticity index of about 24. The Silty Clay is of low plasticity with a liquid limit of about 27 and plasticity index of about 6. The percent fines of Fat Clay and Silty Clay ranges from 90 to 93 percent. The percent fines of Sandy Lean Clay ranges from 50 to 70 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-25	Apple Tree Lane	14	The subsurface soil beneath the pavement along Apple Tree Lane as shown on the boring log GB-25, consists of very stiff to hard, gray, yellowish brown and gray and reddish brown Lean Clay w/sand and Fat Clay to the explored depth of 14 feet.
			The Fat Clay is of high plasticity with a liquid limit ranging from 65 to 69 and a plasticity indices ranging from 40 to 43. The percent fines of Fat Clay ranges from 86 to 96 percent.
GB-26 and GB-27	Hickory Post Lane	13	The subsurface soil beneath the pavement along Hickory Post Lane as shown on the boring log profile presented on Figure 3.8, consists of stiff to hard, gray and yellowish brown and gray, Lean Clay with sand and Lean Clay to explored depth of 13 feet.
			The Lean Clay w/sand and Lean Clay are of high plasticity with liquid limits ranging from 45 to 49 and plasticity indices ranging from 26 to 28. The percent fines of Lean Clay with sand is about 80 percent and the percent fines of Lean Clay is about 88 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-28 and GB-49	Apple Tree Lane	14 and 20	The subsurface soil beneath the pavement along Apple Tree Lane and near the intersection of Apple Tree Lane with White Wing Lane as shown on the boring log profile presented on Figure 3.9, consists of medium stiff to hard, gray, brown and yellowish brown and gray Lean Clay with sand and Fat Clay with sand to the explored depths of 14 to 20 feet.
			The Fat Clay w/sand is of high plasticity with liquid limit of about 51 and plasticity index of about 30. The Sandy Lean Clay, Lean Clay and Lean Clay with sand is of high plasticity with liquid limit of about 49 and plasticity indices ranging from 29 to 30. The percent fines of Lean Clay with sand and Fat Clay w/sand ranges from 72 to 83 percent.
GB-29 and GB-43	Blue Bird Lane	20	The subsurface soil beneath the pavement along Blue Bird Lane and near the intersection of Blue Bird Lane and Rancho Bauer Drive as shown on the boring log profile presented on Figure 3.10, consists of medium stiff to hard, dark gray, gray and yellowish brown and reddish brown Sandy Lean Clay, Lean Clay w/sand and Fat Clay to explored depths of 20 feet.
			The Sandy Lean Clay and Lean Clay with sand is of medium to high plasticity with a liquid limits ranging from 28 to 46 and plasticity indices ranging from 15 to 26. The percent fines of Lean Clay with sand is about 77 percent and the percent fines of Sandy Lean Clay ranges from 65 to 68 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-30 and GB-42	Cardinal Lane	15 and 20	The subsurface soil beneath the pavement along Cardinal Lane and near the intersection of Cardinal Lane with Rancho Bauer Drive as shown on the boring log profile presented on Figure 3.11, consists of stiff to hard, dark gray and gray and yellowish brown Lean Clay with sand and Fat Clay to explored depths of 15 and 20 feet.
			The Fat Clay is of high plasticity with liquid limit of about 55 with plasticity index of about 35. The Lean Clay with sand is of high plasticity with liquid limits ranging from 43 to 47 and plasticity indices ranging from 24 to 27. The percent fines of Fat Clay is about 87 percent. The percent fines of Lean Clay with sand ranges from 75 to 83 percent.
GB-31	Cindywood Circle	15	The subsurface soil beneath the pavement along Cindywood Circle as shown on the boring log GB-31 consists of medium stiff to very stiff gray Sandy Lean Clay and Lean Clay w/sand to the explored depth of 15 feet. The Lean Clay w/sand and Sandy Lean Clay is
			of medium to high plasticity with liquid limits ranging from 30 to 48 and plasticity indices ranging from 14 to 29. The percent fines of Lean Clay w/sand is about 82 percent and the percent fines of Sandy Lean Clay is about 66 percent.
GB-32	Carolcrest Drive	18	The subsurface soil beneath pavement along Carolcrest Drive as shown on boring log GB-32, consists of medium stiff to hard gray and yellowish brown Lean Clay w/sand to the explored depth of 18 feet. A stratum of medium dense gray Sandy Silt is encountered between depths of 10 and 12 feet.
			The Lean Clay w/sand is of medium to high plasticity with liquid limits ranging from 34 to 41 and plasticity indices ranging from 17 to 25. The percent fines of Lean Clay w/sand ranges from 80 to 82 percent. The percent fines of Sandy Silt is about 50 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-33	Kellywood Lane	14	The subsurface soil beneath pavement along Kellywood Lane as shown on boring log GB-33 consists of medium stiff to very stiff gray, yellowish brown Fat Clay and Sandy Lean Clay to the explored depth of 14 feet. The Sandy Lean Clay is of medium plasticity with a liquid limit of about 31 and a plasticity index of 16. The percent fines of Sandy Lean Clay is about 66 percent.
GB-34 and GB-35	River Forest Drive	15	The subsurface beneath pavement along River Forest Drive as shown on boring log profile presented on Figure 3.12 consists of medium stiff to hard gray, brown and yellowish brown Sandy Lean Clay and Lean Clay w/sand to the explored depth of 15 feet. A stratum of medium dense gray Sandy Silt is encountered between depths of 12 and 13.5 feet in boring GB-35. The Lean Clay w/sand is of medium to high plasticity with liquid limit ranging from 31 to 42 and plasticity indices ranging from 15 to 24. The percent fines of Lean Clay w/sand ranges from 71 to 78 percent. The percent fines of Sandy Silt is about 56 percent.
GB-36 and GB-37	Heatherfield Drive	14	The subsurface soil beneath pavement along Heatherfield Drive and as shown on boring log profile presented on Figure 3.13 consists of medium stiff to hard gray, brown, yellowish brown Lean Clay w/sand and Lean Clay to the explored depth of 14 feet. The Lean Clay w/sand and Lean Clay is of medium to high plasticity with liquid limits ranging from 31 to 44 and plasticity indices ranging from 16 to 24. The percent fines of Lean Clay ranges from 91 to 95 percent and the percent fines of Lean Clay w/sand ranges from 72 to 81 percent.

Boring No.	Location/Street	Depth (ft)	Soil Description
GB-38 through GB-44	Rancho Bauer Drive	15 to 20	The subsurface soil beneath pavement along Rancho Bauer Drive as shown on boring log profile presented on Figures 3.14 and 3.15 consists of medium stiff to hard dark gray, gray, brown, yellowish brown and reddish brown Sandy Lean Clay, Lean Clay w/sand, Fat Clay w/sand and Fat Clay to explored depths of 15 to 20 feet.
			The Fat Clay and Fat Clay w/sand is of high plasticity with liquid limits ranging from 51 to 73 and plasticity indices ranging from 30 to 44. The Sandy Lean Clay, Lean Clay w/sand and Lean Clay is of medium to high plasticity with liquid limit ranging from 28 to 47 and plasticity indices ranging from 15 to 29. The percent fines of Fat Clay and Lean Clay ranges from 85 to 89 percent. The percent fines of Fat Clay w/sand and Lean Clay w/sand ranges from 74 to 83 percent. The percent fines of Sandy Lean Clay is about 65 percent.
GB-45 through GB-50	White Wing Lane	15 to 20	The subsurface soil beneath pavement along White Wing Lane as shown on boring log profile presented on Figures 3.16 and 3.17 consists of medium stiff to hard gray, brown, yellowish brown, reddish brown Sandy Lean Clay, Lean Clay w/sand, Fat Clay w/sand and Fat Clay to explored depths of 15 and 20 feet. Fill material consisting of medium stiff to very stiff, gray, brown Fat Clay and medium dense brown Silty Sand was encountered to depths of 6 and 8 feet in borings GB-46 and GB-48.
			The Fat Clay and Fat Clay w/sand is of high plasticity with liquid limit ranging from 51 to 58 and plasticity indices ranging from 30 to 35. The Sandy Lean Clay, Lean Clay w/sand is of medium to high plasticity with liquid limits ranging from 32 to 49 and plasticity indices ranging from 17 to 30. The percent fines of Lean Clay and Fat Clay ranges from 87 to 90 percent. The percent fines of Fat Clay w/sand and Lean Clay w/sand ranges from 72 to 85 percent. The percent fines of Sandy Lean Clay ranges from 68 to 70 percent.

4.5 Water Levels

Groundwater was encountered in borings GB-9, GB-11, GB-12, GB-13, GB-14, GB-18 and GB-22 to depths ranging from 11.0 to 14.0 feet during drilling. The groundwater level, measured 15 minutes after water was first encountered, ranged from 7.0 to 11.7 feet in these borings. No groundwater was encountered in any other borings drilled for this study including the boring converted into piezometer during the field investigation. In piezometer borings GB-1P, GB-22P and GB-49P, the water level measured at 30 days ranges from 5.7 to 11.3 feet. The water level encountered in borings is summarized below.

Boring No.	Location/Street Name	Groundwater Depth During Drilling (ft)	Groundwater Depth After 24 Hours (ft)	Groundwater Depth After 30 Days (ft)
GB-1 (GB-1P)	Chadbourne	Dry	11.7	11.3 on 6-8-13
	Drive			
GB-2	Chadbourne Drive	Dry	N/A	N/A
GB-3	Chadbourne Drive	Dry	N/A	N/A
GB-4	Chadbourne Drive	Dry	N/A	N/A
GB-5	Chadbourne Drive	Dry	N/A	N/A
GB-6	Broadgreen Drive	Dry	N/A	N/A
GB-7	Kickerillo Drive	Dry	N/A	N/A
GB-8	Broadgreen Drive	Dry	N/A	N/A
GB-9	Broadgreen Drive	8.3	N/A	N/A
GB-10	Broadgreen Drive	Dry	N/A	N/A
GB-11	Cindywood Drive	11.7	N/A	N/A
GB-12	Cindywood Drive	7.3	N/A	N/A
GB-13	Cindywood Drive	10.4	N/A	N/A
GB-14	Cindywood Drive	8.6	N/A	N/A
GB-15	Carolcrest Drive	Dry	N/A	N/A
GB-16	Carolcrest Drive	Dry	N/A	N/A
GB-17	Carolcrest Drive	Dry	N/A	N/A
GB-18	Carolcrest Drive	7.0	N/A	N/A
GB-19	Carolcrest Drive	Dry	N/A	N/A

Boring No.	Location/Street Name	Groundwater Depth During Drilling (ft)	Groundwater Depth After 24 Hours (ft)	Groundwater Depth After 30 Days (ft)
GB-20	Kellywood Lane	Dry	N/A	N/A
GB-21	Kellywood Lane	Dry	N/A	N/A
GB-22 (GB-22P)	Kellywood Lane	11.7	8.2	4.7 on 6-8-13
GB-23	Rainwood Drive	Dry	N/A	N/A
GB-24	Clear Spring Drive	Dry	N/A	N/A
GB-25	Apple Tree Road	Dry	N/A	N/A
GB-26	Hickory Post Lane	Dry	N/A	N/A
GB-27	Beverly Hill	Dry	N/A	N/A
GB-28	Apple Tree Lane	Dry	N/A	N/A
GB-29	Blue Bird Lane	Dry	N/A	N/A
GB-30	Cardinal Lane	Dry	N/A	N/A
GB-31	Cindywood Circle	Dry	N/A	N/A
GB-32	Carolcrest Drive	Dry	N/A	N/A
GB-33	Kellywood Lane	Dry	N/A	N/A
GB-34	River Forest Drive	Dry	N/A	N/A
GB-35	River Forest Drive	Dry	N/A	N/A
GB-36 (GB-36P)	Heatherfield Drive	Dry	Dry	Dry
GB-37	Heatherfield Drive	Dry	N/A	N/A
GB-38	Rancho Bauer Drive	Dry	N/A	N/A
GB-39	Rancho Bauer Drive	Dry	N/A	N/A
GB-40	Rancho Bauer Drive	Dry	N/A	N/A
GB-41	Rancho Bauer Drive	Dry	N/A	N/A
GB-42	Rancho Bauer Drive	Dry	N/A	N/A
GB-43	Rancho Bauer Drive	Dry	N/A	N/A
GB-44	Rancho Bauer Drive	Dry	N/A	N/A
GB-45	White Wing Lane	Dry	N/A	N/A

	Location/Street	Groundwater Depth During	Groundwater Depth After 24	Groundwater Depth After 30
Boring No.	Name	Drilling (ft)	Hours (ft)	Days (ft)
GB-46	White Wing Lane	Dry	N/A	N/A
GB-47	White Wing Lane	Dry	N/A	N/A
GB-48	White Wing Lane	Dry	N/A	N/A
GB-49 (GB-49P)	White Wing Lane	Dry	5.7	5.7 on 6-8-13
GB-50	White Wing Lane	Dry	N/A	N/A

However, it should be noted that various environmental and man-made factors such as amount of precipitation, nearby subsurface construction activities, and change in area drainage can substantially influence the groundwater level.

4.6 Environmental Concerns

No environmental concerns were observed or noticed in any of the borings (GB-1 through GB-50) drilled for this study.

5.0 ENGINEERING ANALYSES AND RECOMMENDATIONS

5.1 General

The proposed water line improvements in the Kickerillo Area are shown on Figure 1 "Vicinity Map."

5.2 Trench Excavation (Auger Pits)

Based on the information provided by Jones and Carter, Inc., it is understood that the water line replacement will be by trenchless method of construction. The following subsections provide information for the design and construction of the water lines and the excavations required for the proposed auger pit installation.

5.2.1 Geotechnical Parameters. Based on the soil conditions revealed by the borings GB-1 through GB-50, geotechnical parameters were developed for the design of auger pit construction as part of the water line replacement. The design parameters are provided in Table 2. For design, the groundwater level should be assumed to exist at the ground surface.

5.2.2 Excavation Stability (Auger Pits). The open excavation may be shored or laid back to a stable slope or supported by some other equivalent means used to provide safety for workers and adjacent structures, if any. The excavating operations should be in accordance with OSHA Standards, OSHA 2207, Subpart P, latest revision and the City of Houston Standard Specification.

- Excavation Shallower Than 5 Feet Excavations that are less than 5 feet deep (critical height) should be effectively protected when an indication of dangerous ground movement is anticipated.
- <u>Excavations Deeper Than 5 Feet</u> Excavations that are deeper than 5 feet should be sloped, shored, sheeted, braced or laid back to a stable slope or supported by some other equivalent means or protection such that workers are not exposed to moving ground or cave-ins. The

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slopes and shoring should be in accordance with the trench safety requirements as per OSHA Standards. The following items provide design criteria for excavation stability.

- (i) OSHA Soil Type. Based on the soil conditions revealed by borings drilled for this study and assumed groundwater level at surface, OSHA soil type "C" should be used for determination of allowable maximum slope and/or the design of shoring along the alignment for full proposed depth of open excavation. For shoring deeper than 20 feet (if needed), an engineering evaluation is required and deeper soil borings will be needed.
- (ii) Excavation Support Earth Pressure. Based on the subsurface conditions indicated by our field investigation and laboratory testing results, excavation support earth pressure diagrams were developed and are presented on Figures 5.1 through 5.3. These pressure diagrams can be used for the design of temporary trench bracing. For a trench box, a lateral earth pressure resulting from an equivalent fluid with a unit weight of 96 pcf can be used. The effects of any surcharge loads at the ground surface should be added to the computed lateral earth pressures. A surcharge load, q, will typically result in a lateral load equal to 0.5 q. The above value of equivalent fluid pressure is based on assumption that the groundwater level is near the ground surface, since these conditions may exist after a heavy rain or flooding.
- (iii) <u>Bottom Stability.</u> In braced cuts, if tight sheeting is terminated at the base of the cut, the bottom of the excavation can become unstable. The parameters that govern the stability of the excavation base are the soil shear strength and the differential hydrostatic head between the groundwater level within the retained soils and the groundwater level at the interior of the trench excavation. For cut in cohesive soils as predominantly encountered for the proposed excavation depths in most of the borings, the bottom stability can be evaluated as outlined on Figure 6. However, at locations near borings GB-9, GB-14 and GB-32 where cohesionless soils (such as silty sand, clayey silt and sandy silt) were encountered between depths of 10 and 20

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feet (at invert or within 3 feet of bottom of excavation), dewatering will be necessary to avoid bottom stability problems.

<u>5.2.3 Groundwater Control.</u> Excavations for the water line may encounter groundwater seepage to varying degrees depending upon the groundwater conditions at the time of construction and the location and depth of the trench. Based on the soil conditions identified in the borings for the proposed water line replacement, all the excavations (auger pits) will be in cohesive soils.

In general for cohesive soils as predominantly encountered for most of the borings for the excavation depths, the groundwater if encountered may be managed by collection in excavation bottom sumps for pumped disposal. However, in borings GB-9, GB-14 and GB-32 where cohesionless soils were encountered at invert or within 3 feet of bottom of the excavation; dewatering will be required. Dewatering such as vacuum well points up to 15 feet or deep wells with submersible pumps for excavation greater than 15 feet may be required to lower the groundwater level to at least 5 feet below the bottom of the excavation (auger pits). It is recommended that the actual groundwater conditions should be verified by the contractor at the time of construction and that groundwater control should be performed in general accordance with the City of Houston Standard Specifications, Section 01578.

<u>5.2.4 Auger Pit Backfill</u>. The excavated auger pits should be backfilled per the City of Houston Standard Specification Section 02447, Subsection 3.04 and Drawing No. 02447-01.

5.3 Trenchless Installation - Pipe and Auger Casing

It is understood that the proposed water lines will be installed using trenchless method.

5.3.1 Geotechnical Parameters for Pipe and Auger Casing. Based on the soil conditions revealed by borings GB-1 through GB-50 and laboratory test data, geotechnical design parameters were developed for cohesive soils and cohesionless soils for Pipe and Auger Casing installation and are provided in Table 3. For design conditions, the groundwater levels should be assumed to exist at the ground surface.

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5.3.2 Earth Pressure on Auger Casing. The earth pressures on the auger casing should be

determined from Figure 7. Equations to calculate the tunnel liner loads are also shown in Figure 7.

For crossing under the major roads, the stress due to traffic loads should be considered.

5.3.3 Live Loads on Pipeline Due to Traffic. Loads on the pipe due to traffic should be

considered. A graph providing calculated vertical stress on pipe due to traffic loads is given on

Figure 8.

5.3.4 Carrier Pipe Design Parameters. Carrier pipe must be sufficiently strong to withstand

anticipated long-term ground loads and must not be subject to deterioration by substance either in the

ground or in the auger casing. The carrier pipe design should include consideration of not only the

loads applied to the pipe but also factors other than soil loading. These factors could include

minimum structural code requirements, loading from pipe jacking operations and other construction

loads. The drained geotechnical design parameters given in Table 3 should be used in analyzing the

soil structure interaction of the carrier pipe.

5.4 Piping System Thrust Restraint

Unbalanced thrust forces will occur at any point in the pipe where the direction or cross

sectional area of the flow changes. The force diagram shown in Figure 9 illustrates the thrust force

generated by flow at a bend in the pipe. The equations for computing this thrust force are also given

in this figure. The thrust force will often require more resistance or support than is available just

from the pipe bearing against the backfill. In order to prevent intolerable movement and

overstressing of the pipe, suitable buttressing should be provided.

Based on the drawings provided to us, it was noted that several horizontal bends are proposed

which may require restraint in addition to that supplied by the pipe bearing on the backfill. In

general, thrust blocks, both horizontal and vertical and restrained joints are common methods of

supplying additional reaction. However, it is noted that restrained joints are considered for supplying

additional reaction for the project and is discussed below.

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<u>5.4.1 Restrained Joints.</u> Where thrust blocks are not practical, restrained joints, allowing thrust and shear forces to be transmitted across the pipe joints, are employed to allow a number of pipe sections to act integrally in bearing. The equations necessary to determine the restrained pipe length on each side of the bend are given below:

$$L = \frac{PA \left(1 - Cos\theta\right)}{\mu(W_e + W_p + W_w)}$$

where, L = restrained pipe length on each side of the bend, in feet

P = internal pressure, in pounds per square inch

A =cross sectional area of first unrestrained pipe joint, in square inches

 θ = deflection angle of bend, in degrees

 μ = co-efficient of friction between pipe and soil (recommended 0.3)

 W_e = overburden load, in pounds per liner foot = Υ_b B_cH

 W_p = weight of pipe, in pounds per linear foot

 W_{w} = weight of water in pipe, in pounds per linear foot

 Υ_b = wet unit weight of backfill material, in pounds per cubic foot (recommended 120 pcf)

 B_c = pipe outer diameter, in feet

H = earth cover, in feet

Reinforced concrete encasement may be used in lieu of the manufactured joint restrained system. The equations and soil parameters given above can be used for the design of reinforced concrete encasement.

5.5 Influence of Trenchless Operation on Adjacent Structures

Surface and near-surface structures near the pipe and casing augering primarily consist of residential buildings, city streets and public utilities.

Ground movement, in terms of loss of ground or ground lost, is commonly associated with soft ground augering. If such ground movement is excessive, it may cause damage to the structures, roads and services located above the auger casing. While ground movement cannot be eliminated, it can be controlled within certain limits by the use of proper construction techniques and good quality workmanship. These include, but are not limited to, prevention of excessive ground loss during trenchless operation with the use of grouting and filling the annular space between the pipe or casing and the surrounding soil and prevention of undue loss of fines through dewatering.

The selection and execution of trenchless methods that are best suited to anticipated ground conditions along the proposed auger casing are, in fact, the contractor's primary contribution to successful completion of the proposed auger casing. Review of the boring logs revealed that the ground conditions for augering (excavation face) will be primarily through Sandy Lean Clay, Lean Clay with sand, Lean Clay, Fat Clay and Fat Clay with sand. The cohesive soils within the natural soils are medium stiff to very stiff in consistency and the ground in this area may be expected to behave as squeezing to raveling ground near the invert. The existing natural soils consisting of Sandy Silt, Silty Sand and Clayey Silt was encountered near the proposed invert depths of trenchless installation in borings GB-9, GB-14 and GB-32. The cohesionless soils (silty sand, sandy silt and clayey silt) within the natural soils are medium dense and the ground at these locations may be expected to behave raveling to running ground near the invert depths. Hence, extra precautions will be required at these locations during the trenchless installation to prevent any excessive ground loss due to the disturbance and removal of the cohesionless soils. Close monitoring of ground movement should be carried out during the trenchless installation.

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The extra precautions may include:

• Shorten duration between auger excavation and pushing of casing/pipe as minimum as

possible.

• Alternatively use steel pipe in these areas.

• If any excessive ground loss is observed during closed monitoring, grouting will be

required to fill any voids.

At locations near borings GB-9, GB-14 and GB-32, the ground conditions for trenchless

operation (excavation face) will be through cohesive soil interface with cohesionless soils or in

cohesionless soils. In such conditions, dewatering will be necessary.

The proposed auger casing is parallel with or crosses beneath a number of water, gas, power,

telephone and storm and sanitary sewer lines. The largest potential problems from utilities may result

from:

• Leaking water pipes

• Gas pipe breakage leading to a potential explosion

• Breakage of storm or sanitary sewers

In general, it is the contractor's responsibility to investigate these and other possible third party

interactions along the proposed water line alignment and to accommodate all of these interactions with

the use of good construction methods.

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5.6 Pavement Repair and Subgrade Stabilization

The pavement repair at the auger pit locations and other locations where required should be performed in accordance with City of Houston Standard Specification No. 02951 "Pavement Repair and Restoration" and City of Houston Standard Drawing Nos. 02951-01, 02 and 03.

The subgrade stabilization for the pavement repair should be performed as described below.

Based on the field and laboratory test data, the surficial subgrade soils in the project area consists of predominantly cohesive soils (sandy lean clay, lean clay and fat clay) with high plasticity. These high plasticity cohesive soils should be stabilized with a minimum of 6% hydrated lime (by dry unit weight) to a depth of minimum 6-inches.

The lime stabilization of clay subgrade should be performed in accordance with City of Houston Standard Specification No. 02336 "Lime Stabilized Subgrade."

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Auger Pit Excavation and Water Line Construction

Whenever practical, excavations should be performed during dry weather. All excavated areas (auger pits) should be adequately protected from surface run-off water with appropriate measures to prevent ponding of water in and around the excavation. Excavations should be properly sloped, shored, braced, or protected in accordance with OSHA's excavation safety standard, 29CFR Part 1926, Subpart P (Excavations and Trenches) Standards.

The selection and execution of augering methods that are best suited to anticipate ground conditions along the proposed auger casing should be contractor's primary responsibility for successful completion of proposed augering. The anticipated ground conditions for augering (excavation force) are discussed in Section 5.5.

6.2 Groundwater Control

Auger pit excavations may encounter groundwater seepage. It is our opinion that in cohesive soils, as encountered in most of the borings for the proposed excavation depths, the groundwater may be collected in excavation bottom sumps for pumped disposal. However, in borings GB-9, GB-14 and GB-32 where cohesionless soils were encountered at invert or within 3 feet of bottom of the excavation; dewatering will be required. Dewatering such as vacuum well points up to 15 feet or deep wells with submersible pumps for excavation greater than 15 feet may be required to lower the groundwater level to at least 3 feet below the bottom of the excavation (auger pits). The contractor should verify the groundwater level at the time of construction and should provide an adequate dewatering system, where required.

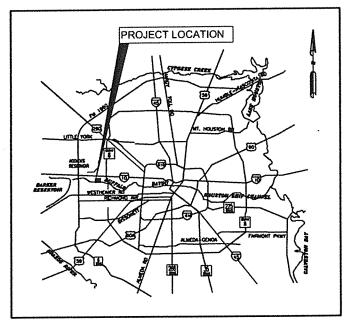
7.0 LIMITATIONS

The description of subsurface conditions and the design information contained in this report are based on the soil borings made at the time of drilling at specific locations. However, some variation in soil conditions may occur between soil borings. Should any subsurface conditions other than those described in our boring logs be encountered, Geotest should be immediately notified so that further investigation and supplemental recommendations can be provided. The depth of the groundwater level may vary with changes in environmental conditions such as frequency and magnitude of rainfall. The stratification lines on the log of borings represent the approximate boundaries between soil types, however, the transition between soil types may be more gradual than depicted.

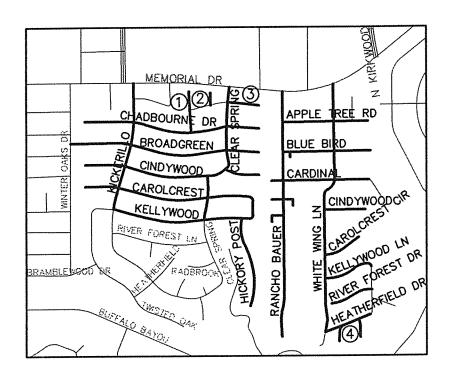
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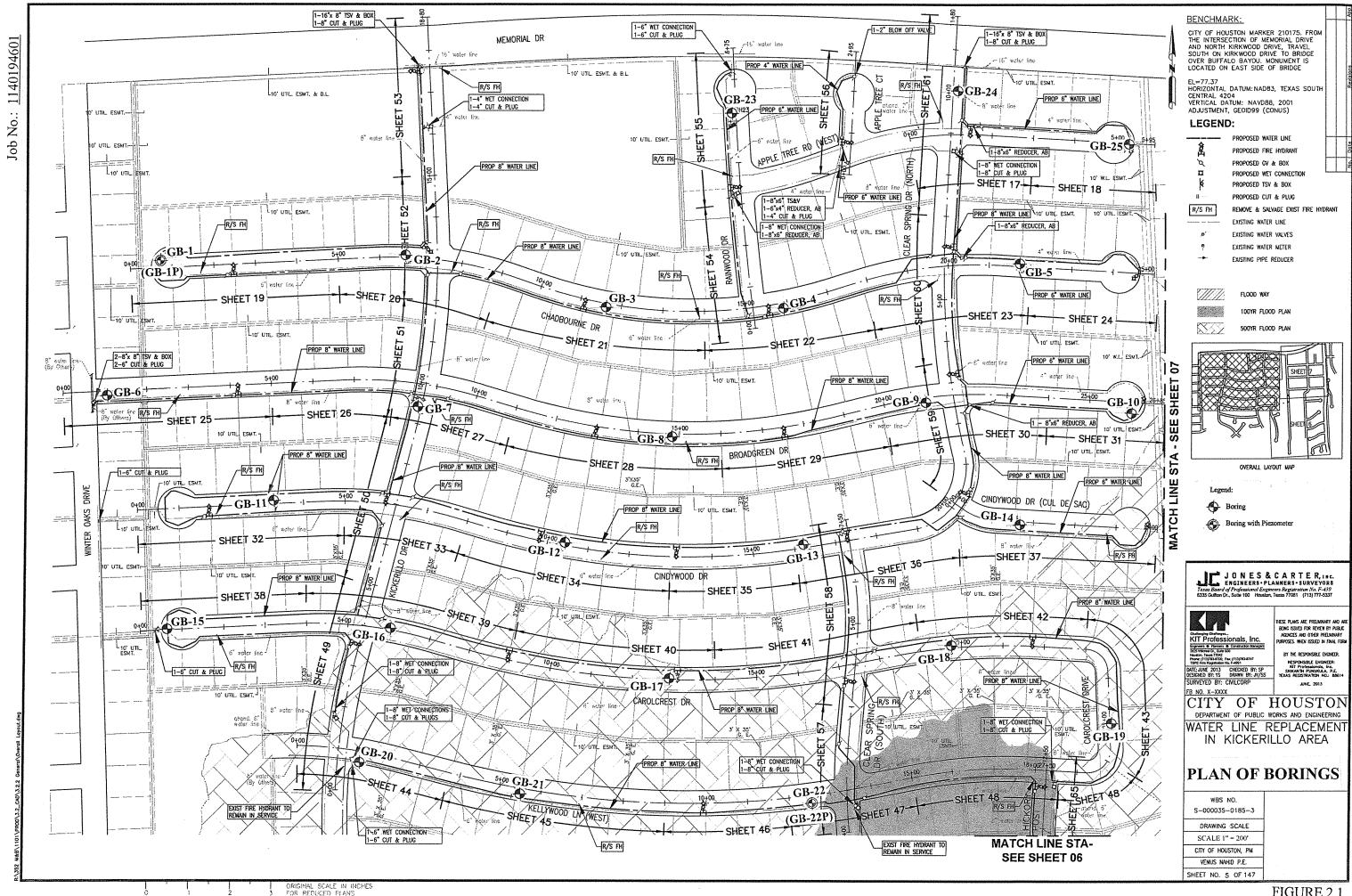
LOCATION MAP



KICKERILLO PROJECT LOCATION

KEY MAP NO.: 488H, M & 489 E, J

VICINITY MAP



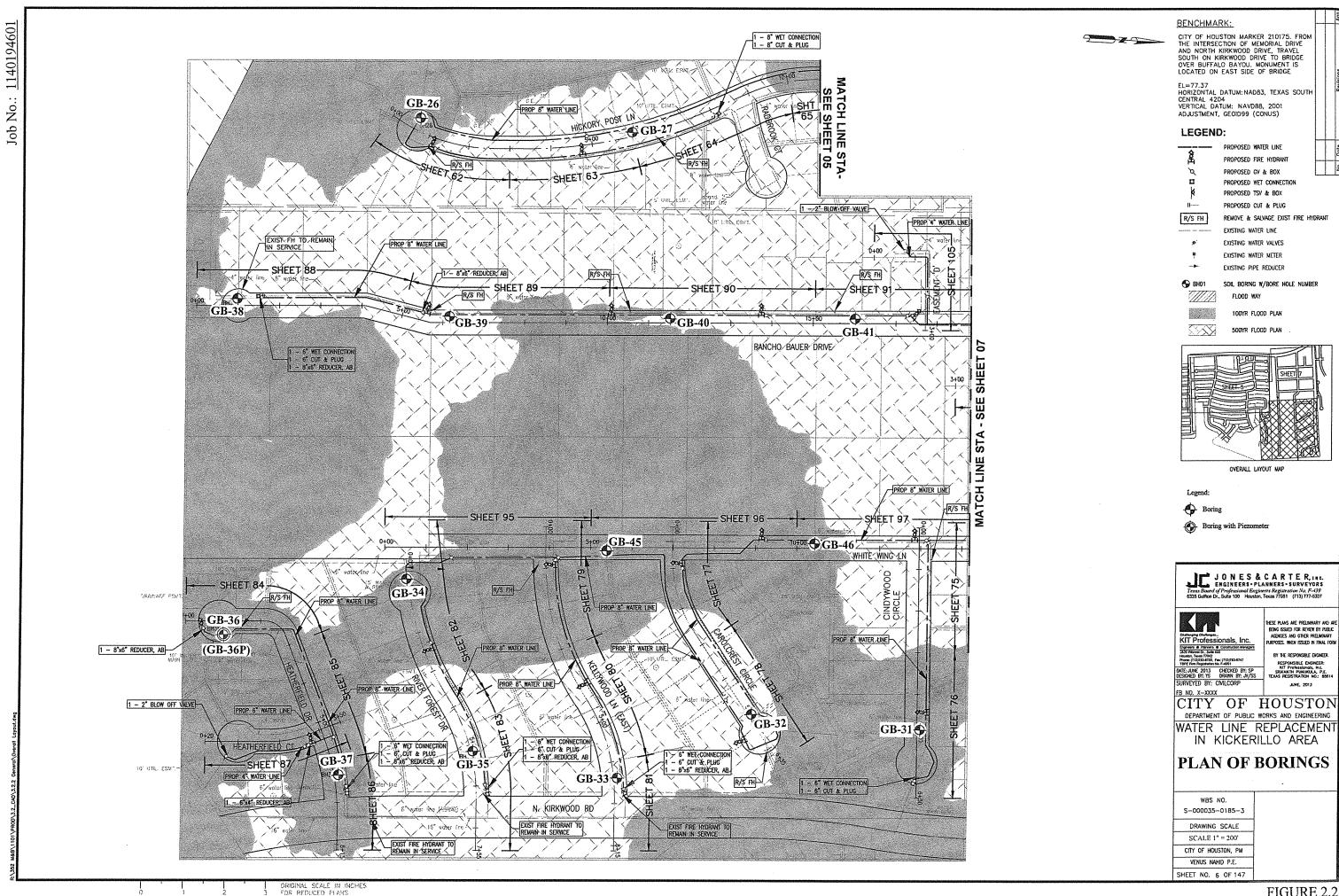
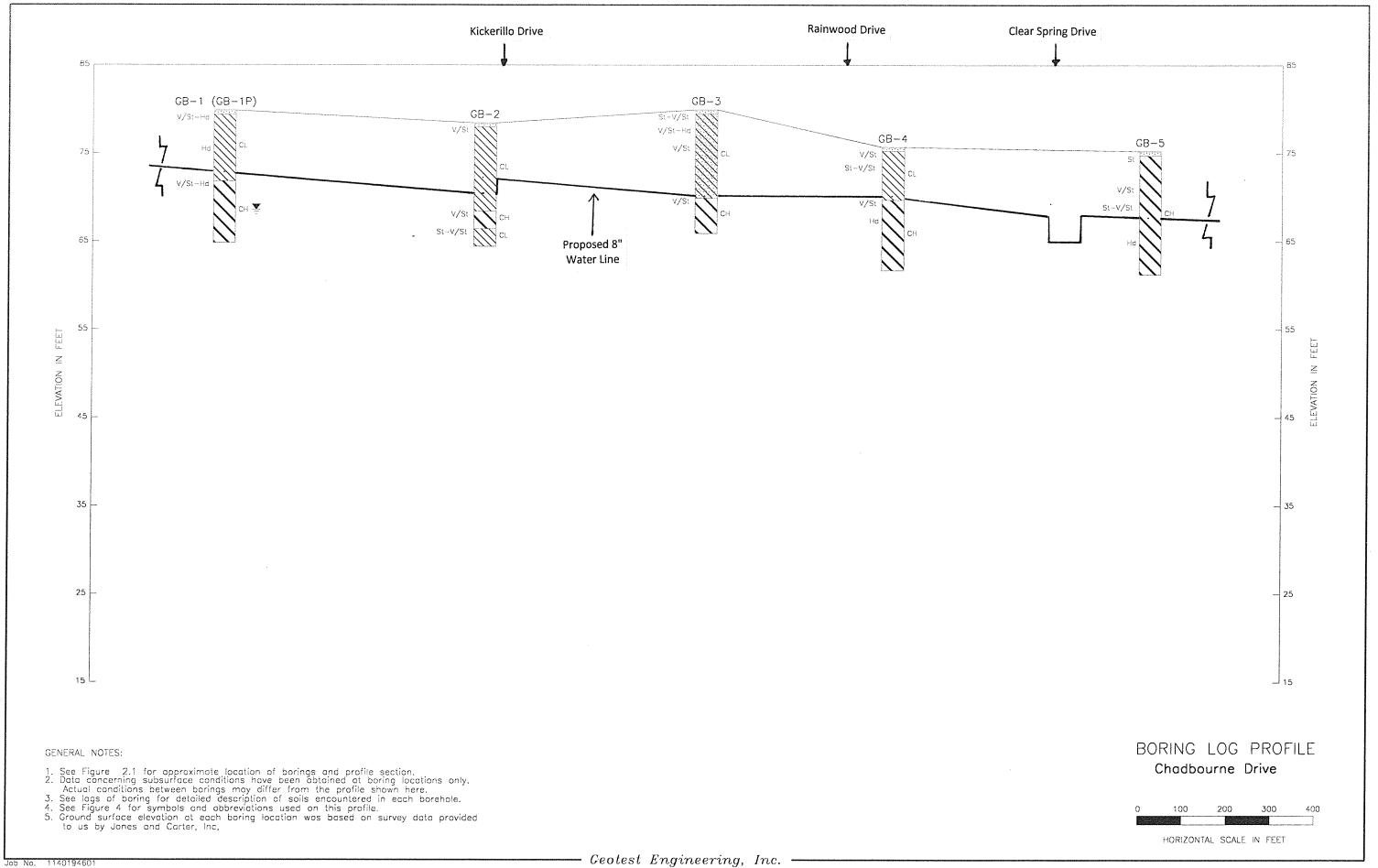
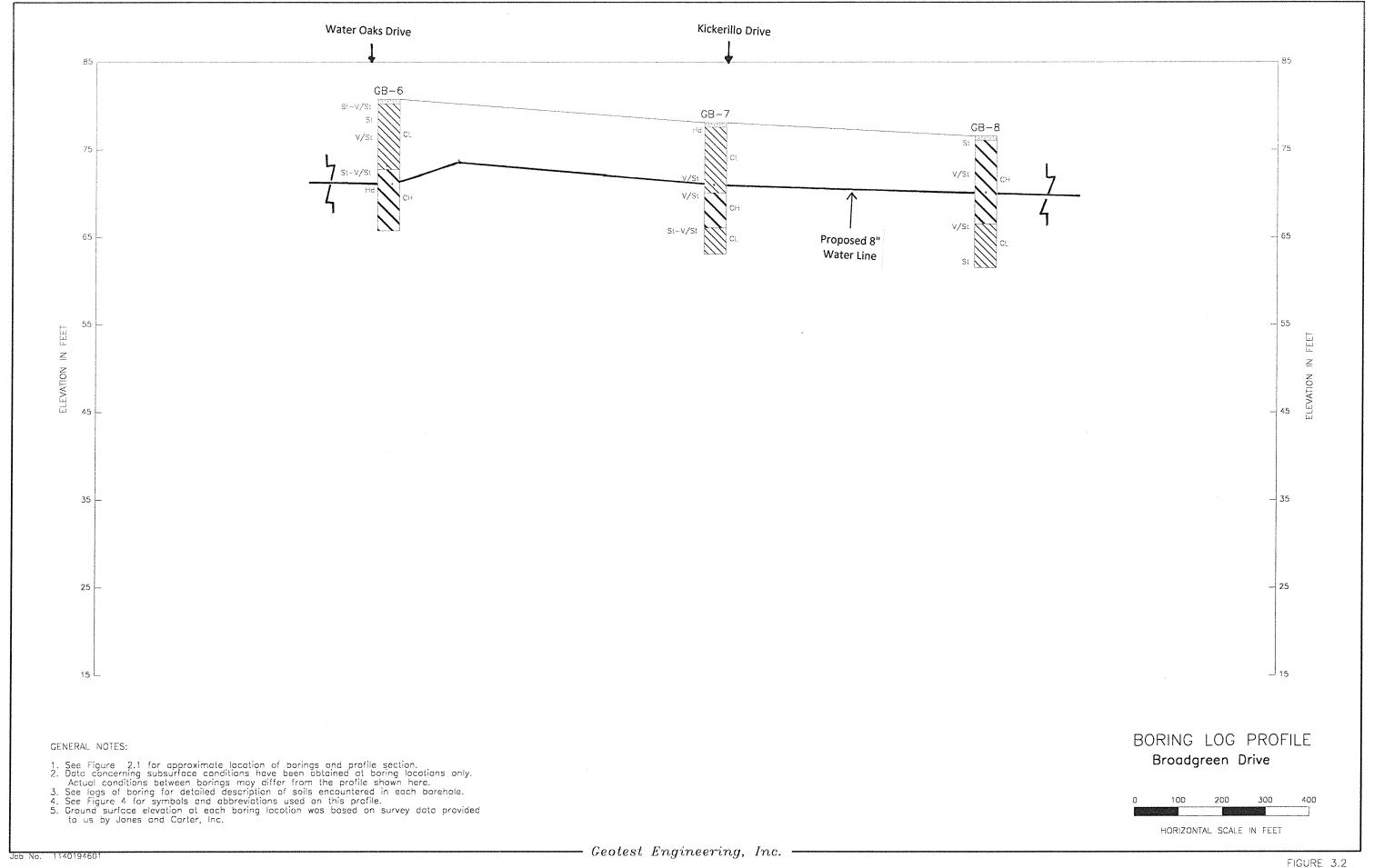
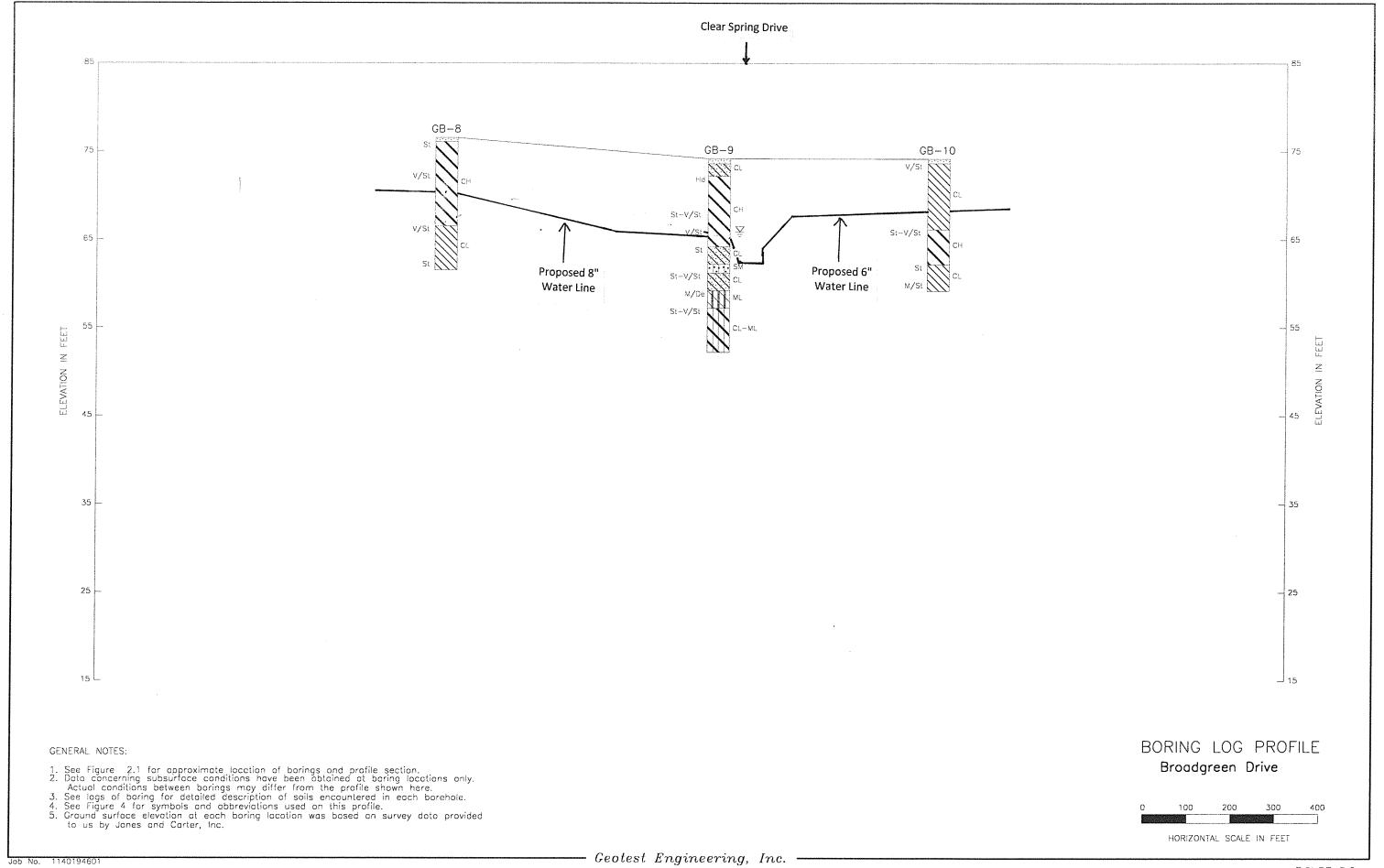
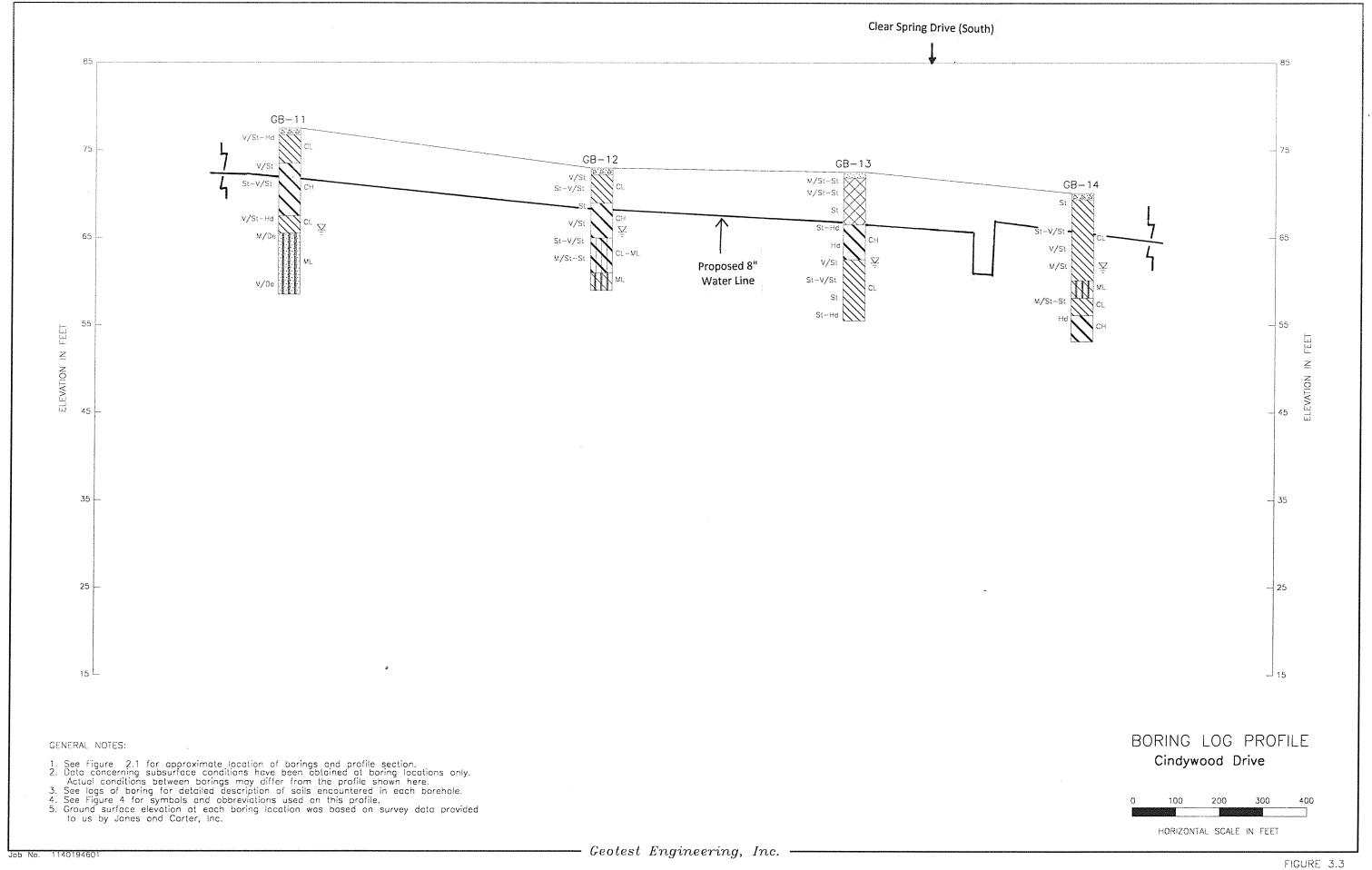


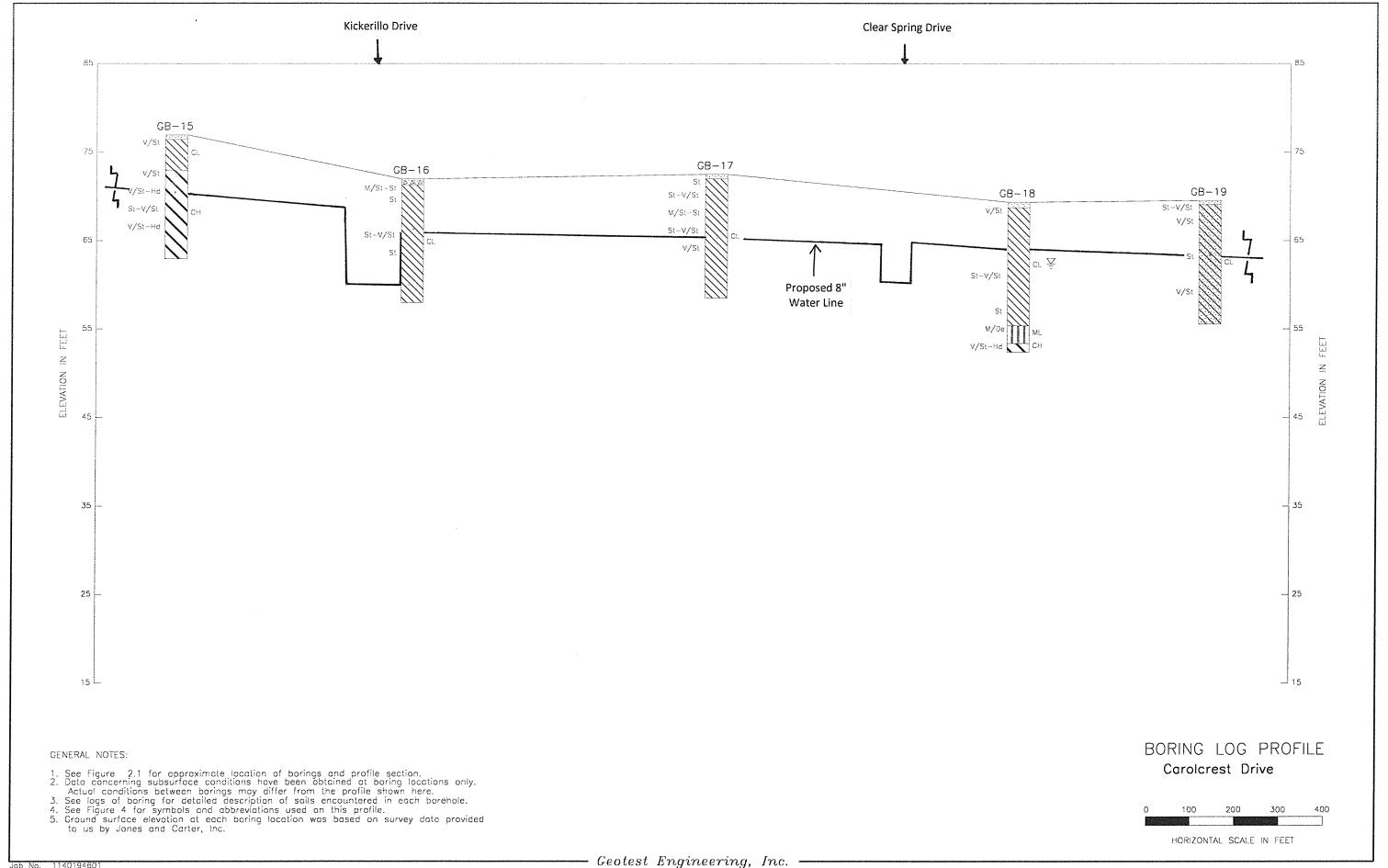
FIGURE 2.3

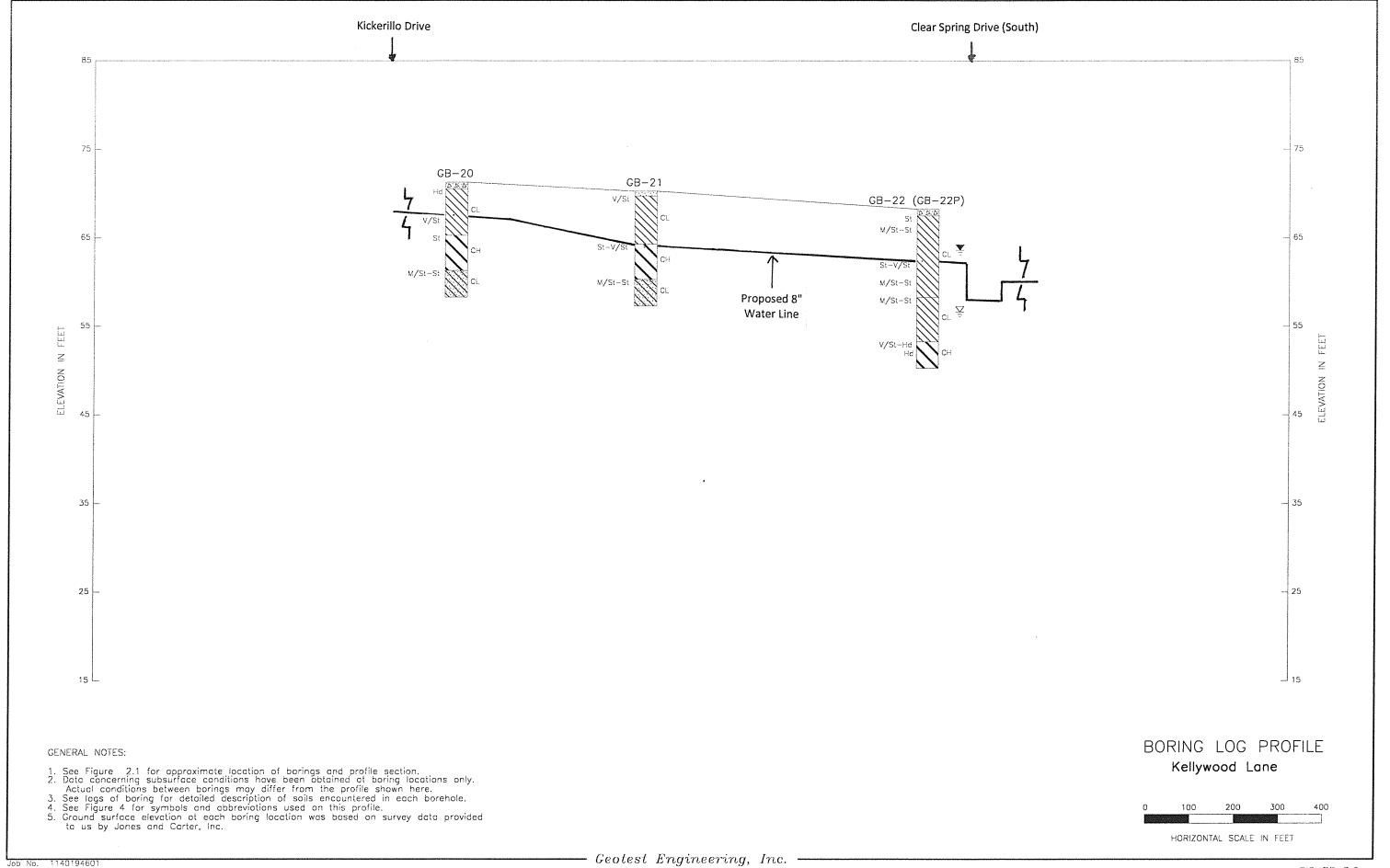


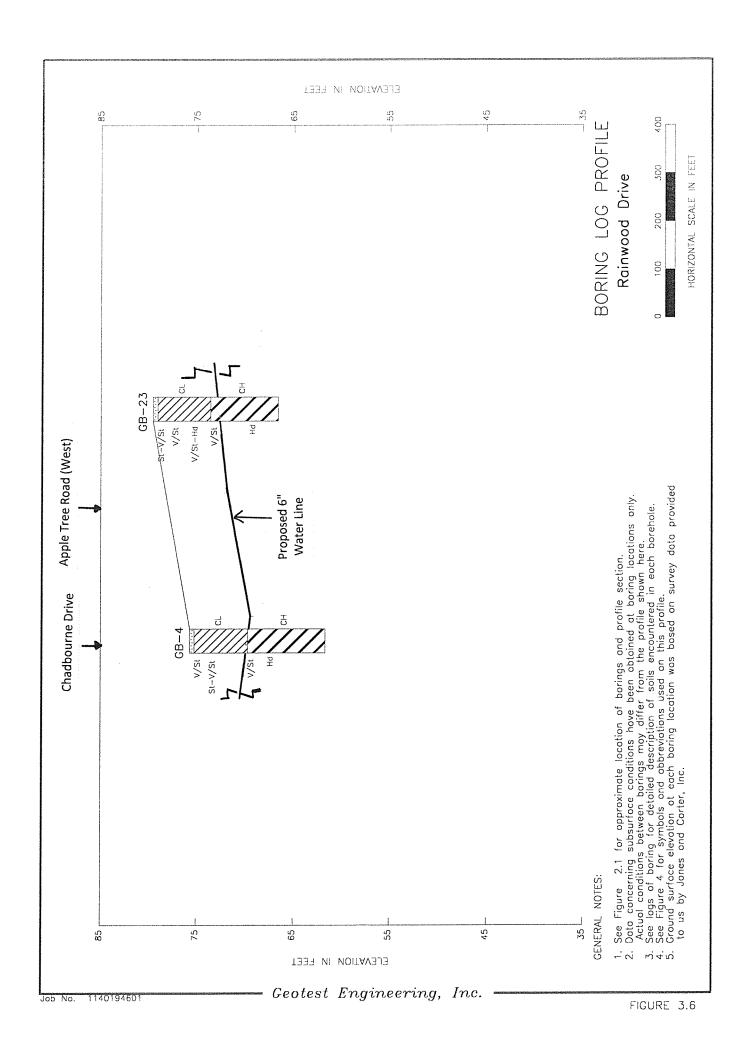


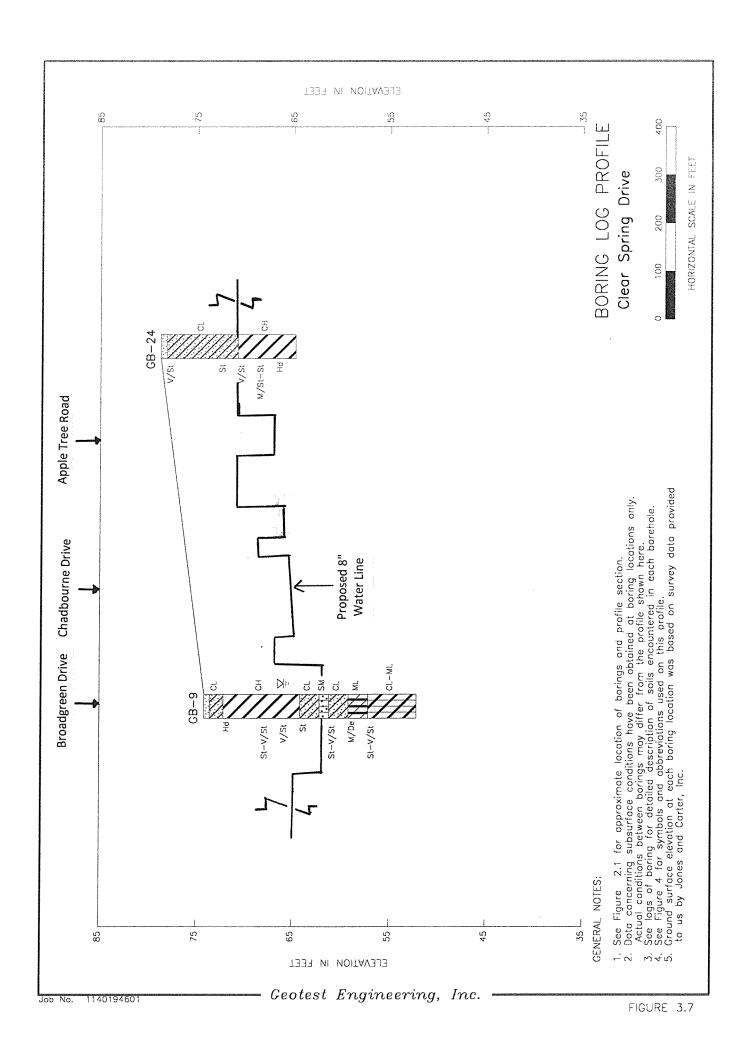


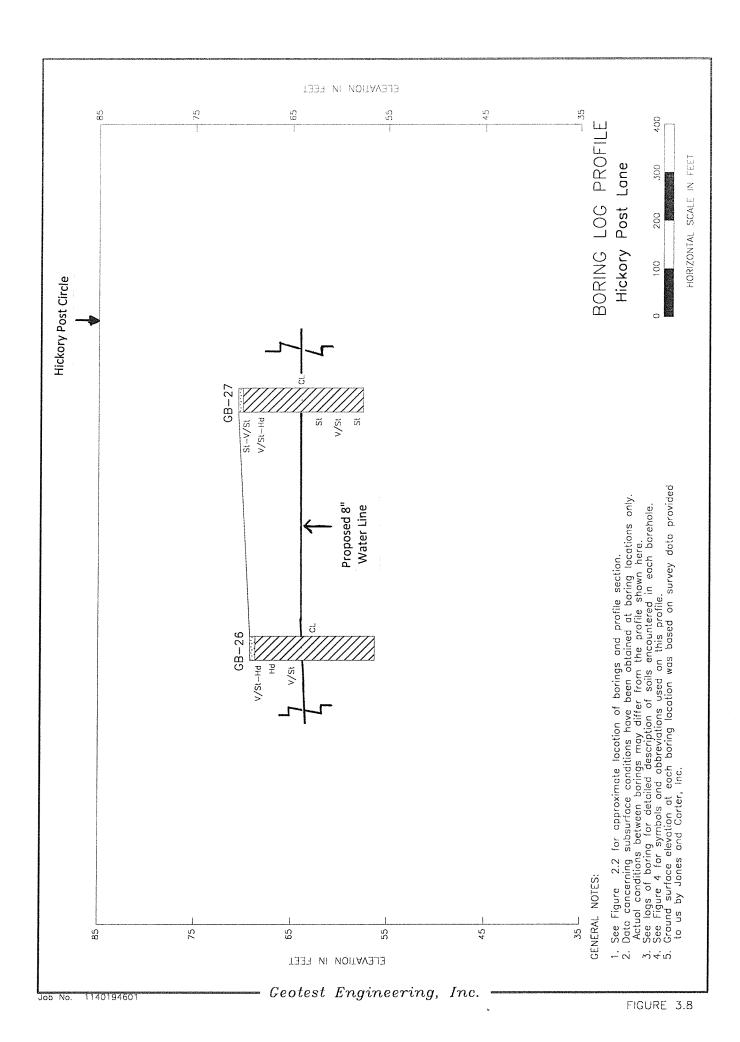


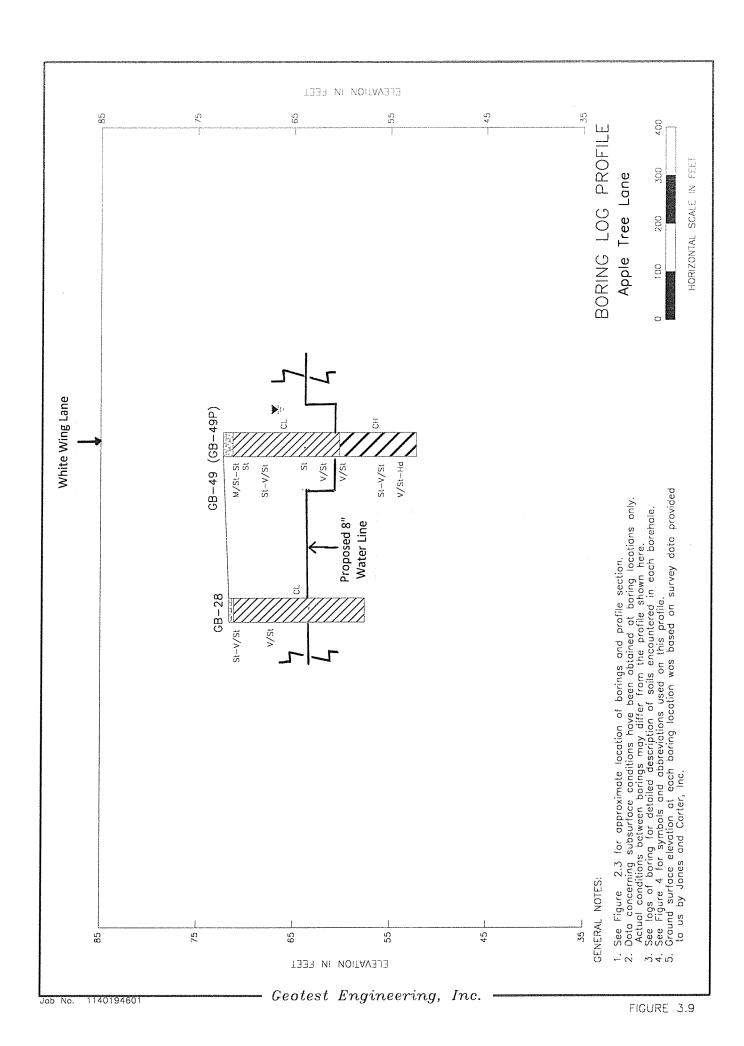


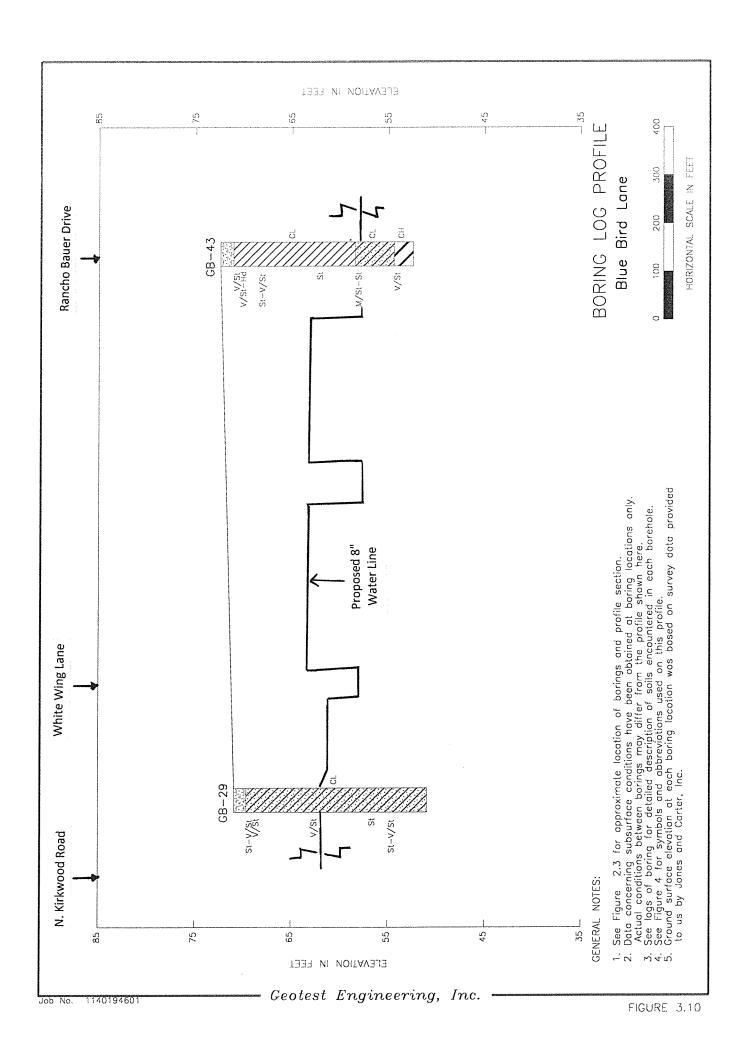


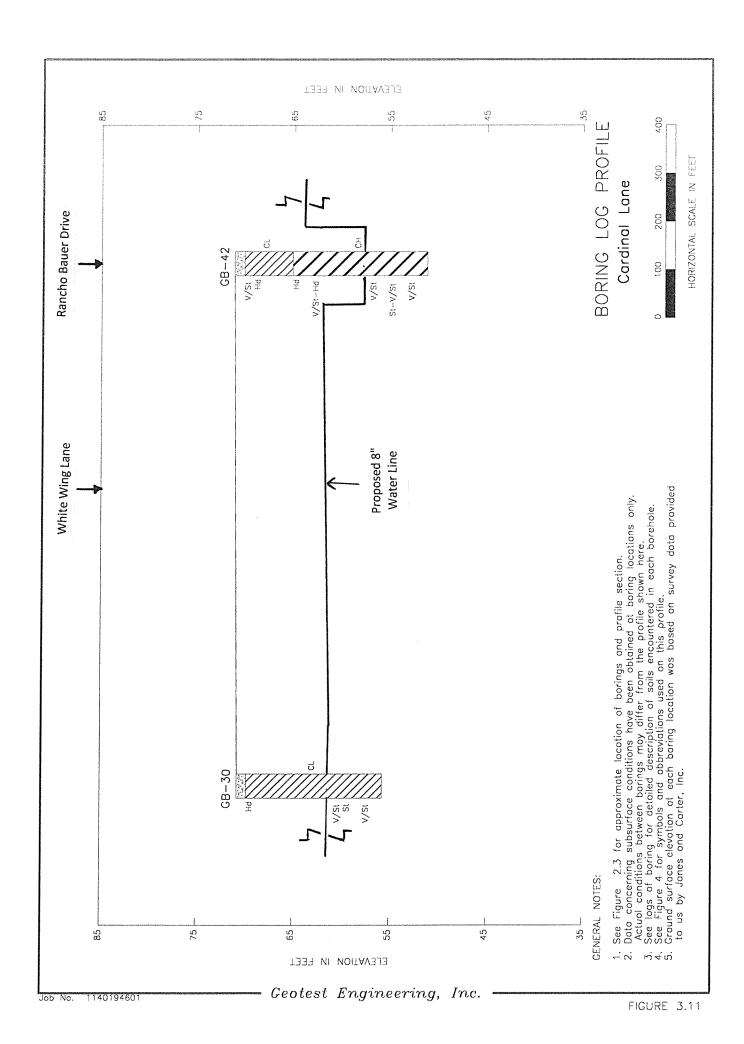


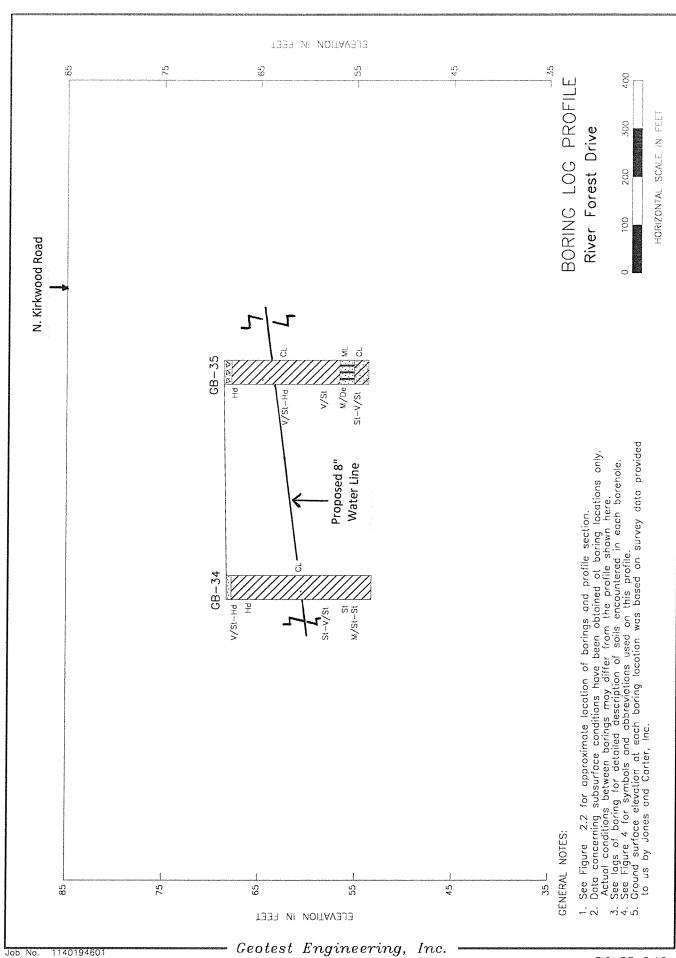


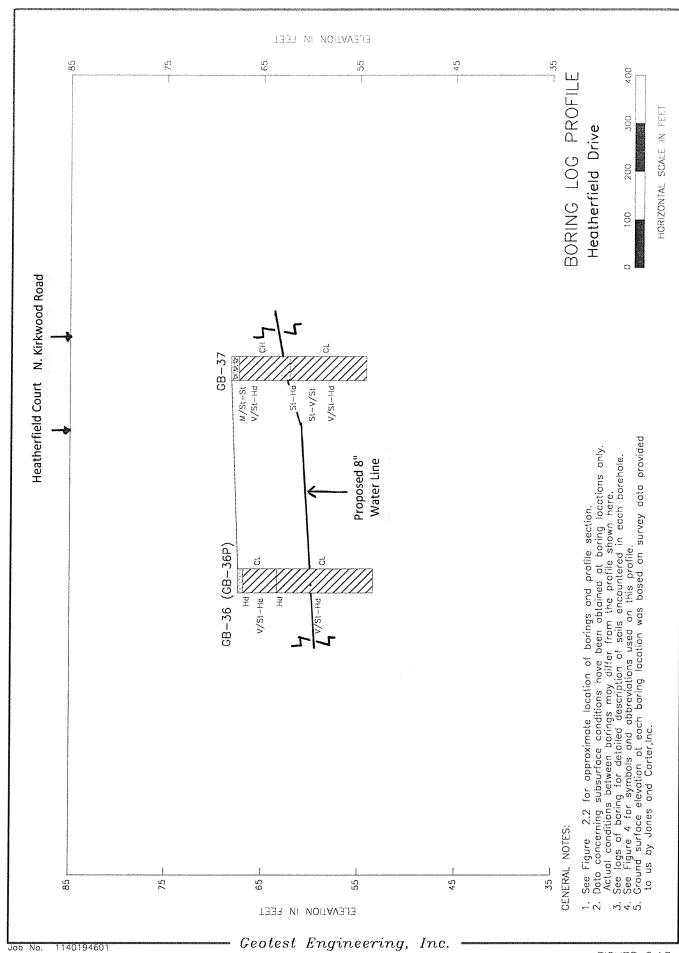


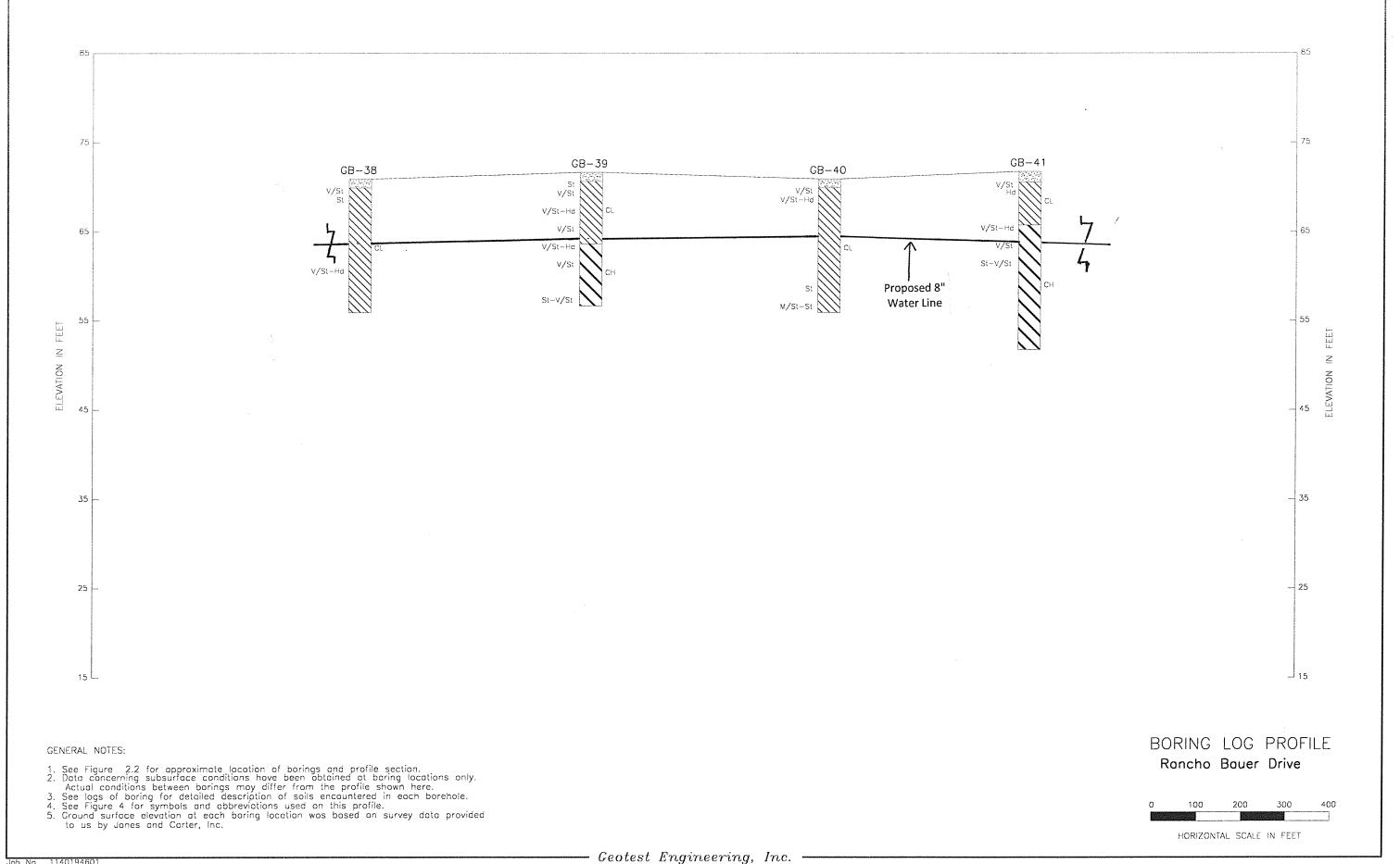


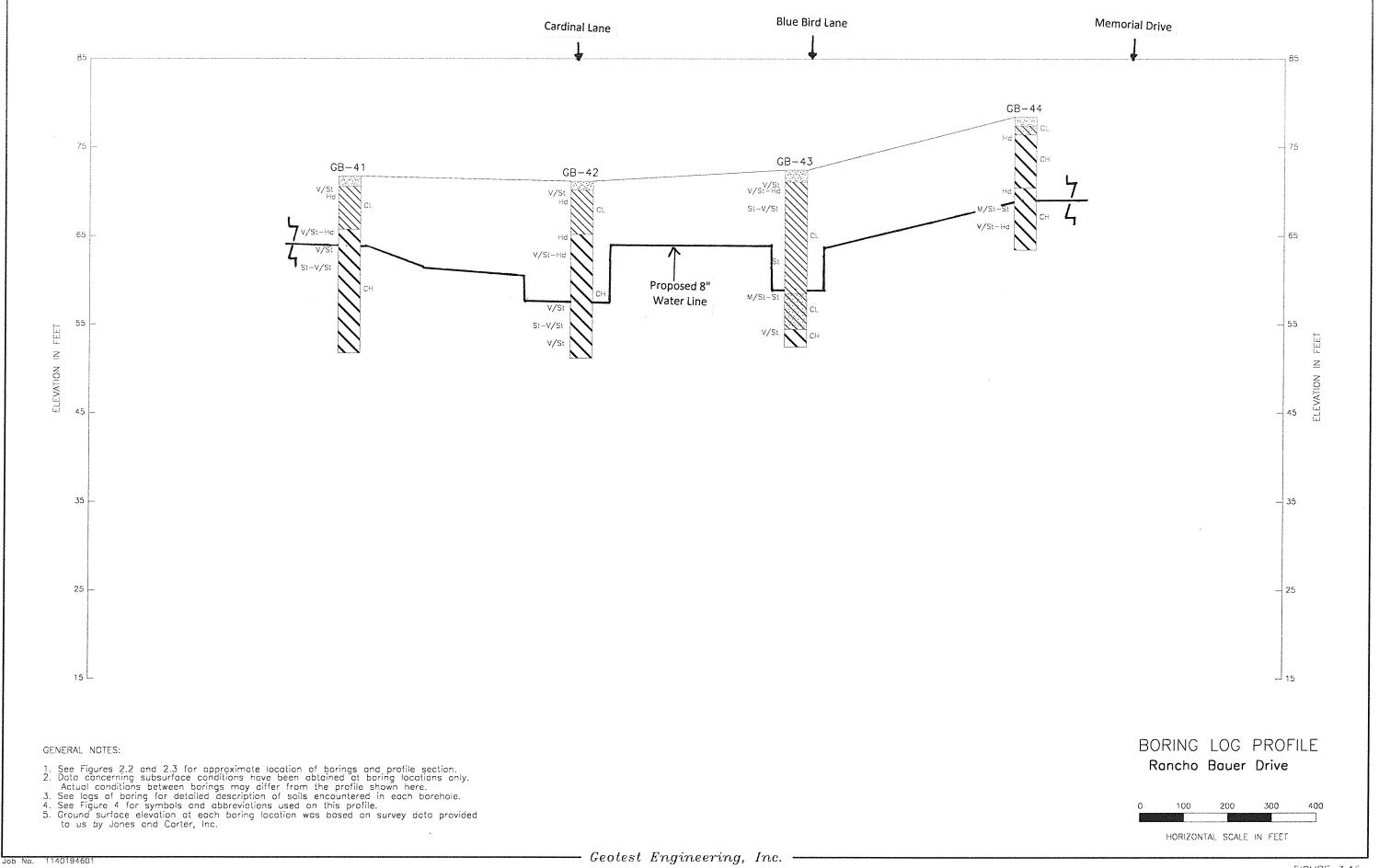


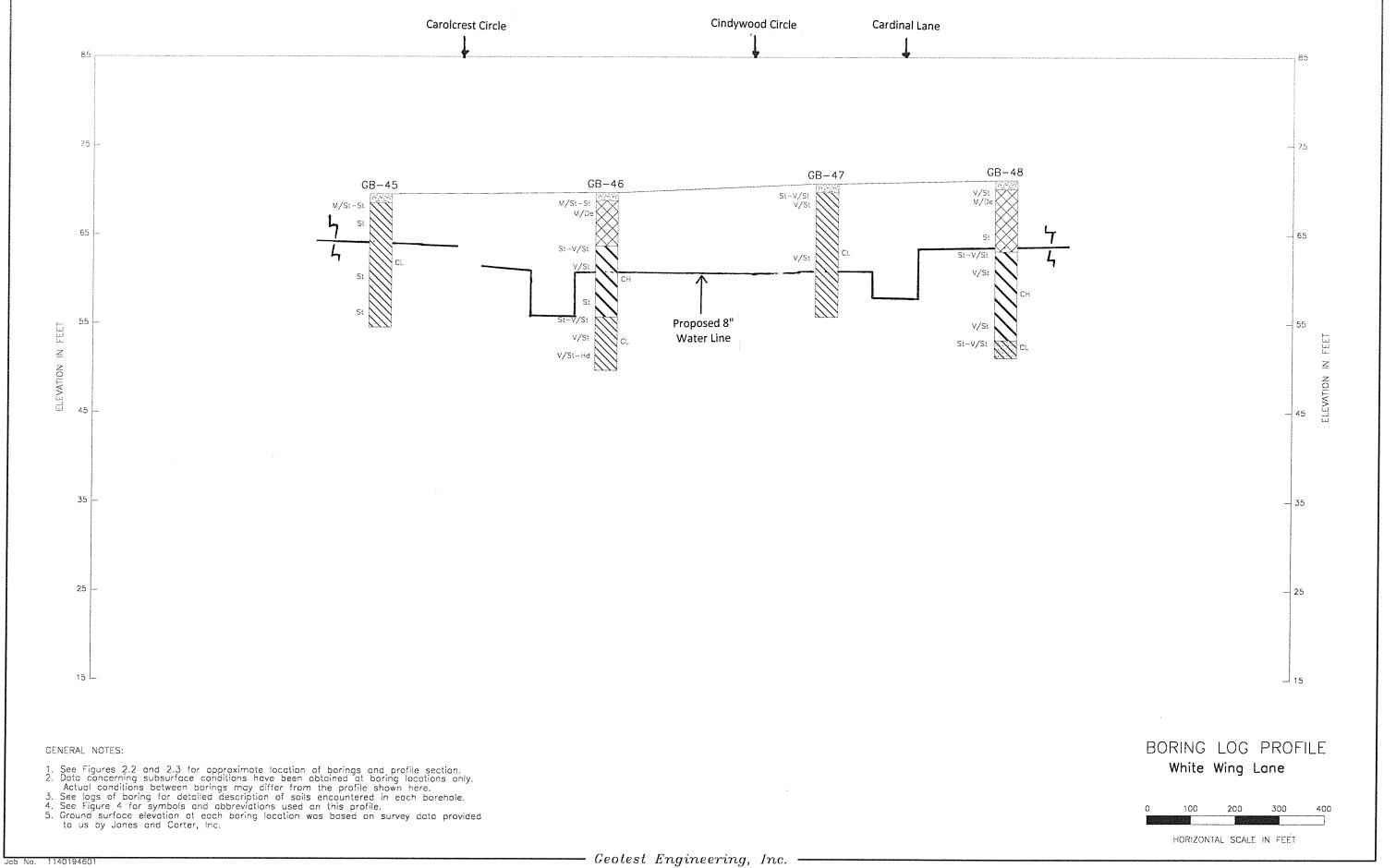


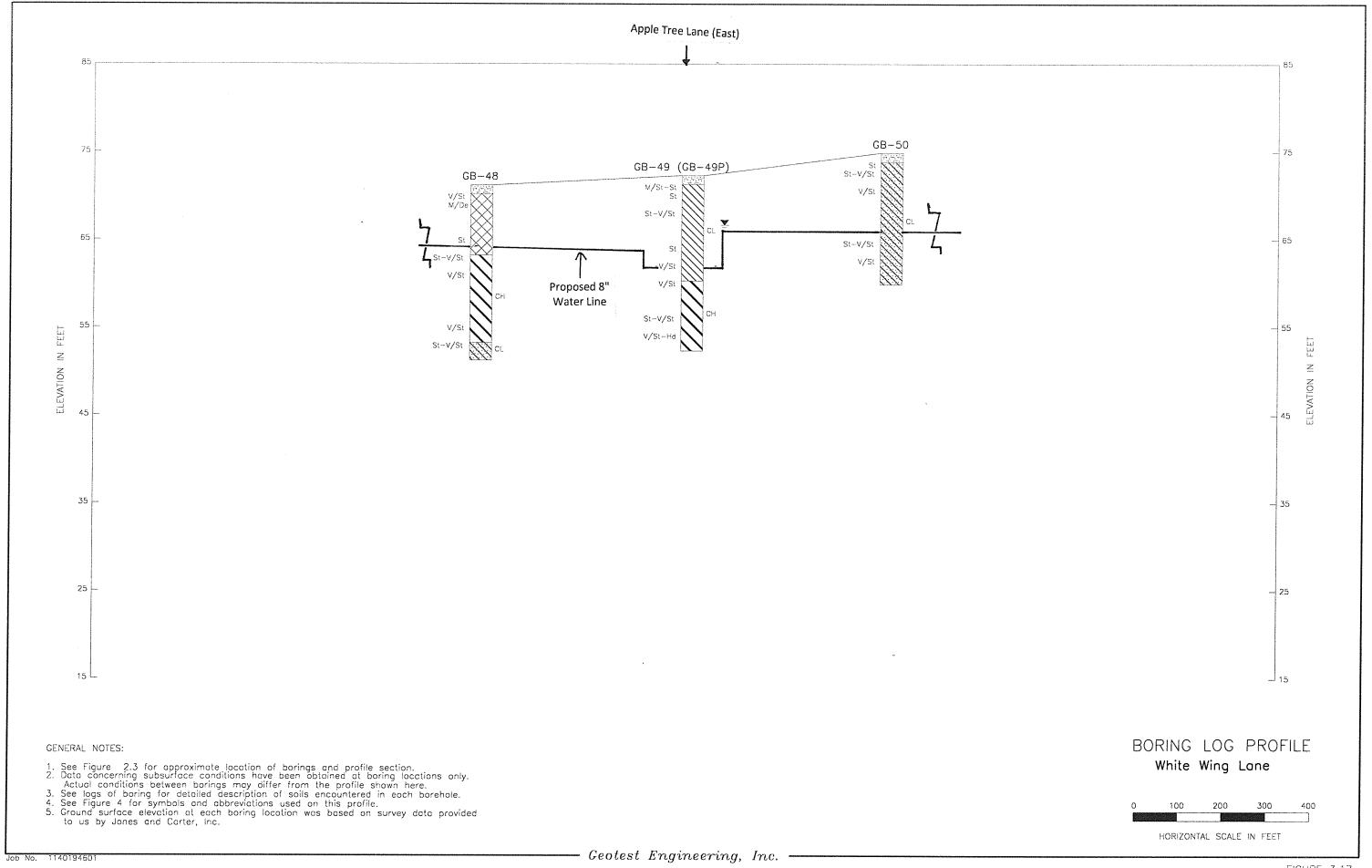






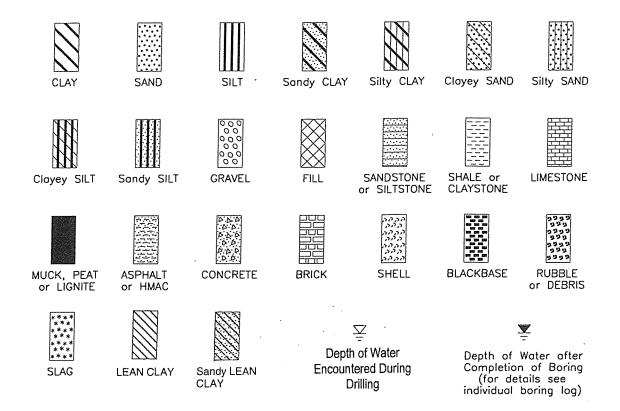






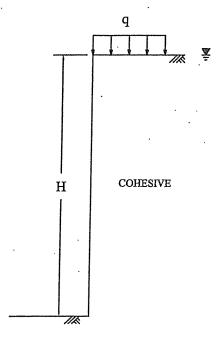
SYMBOLS AND ABBREVIATIONS USED ON BORING LOG PROFILE

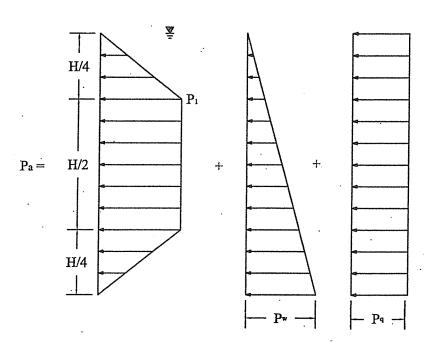
LEGEND



ABBREVIATIONS USED FOR CONSISTENCY/DENSITY

COHESIONLESS SOILS COHESIVE SOILS V/Lo : Very Loose V/So : Very Soft Lo : Loose So : Soft S/Co : Slightly Compact Fm : Firm Co : Compact M/St : Medium Stiff St : Stiff M/De : Medium Dense V/St : Very Stiff De : Dense : Hard V/De : Very Dense Hd V/Hd : Very Hard





TYPICAL SOIL PARAMETERS

See Table 2 for typical values of soil parameters

BRACED WALL

For $\gamma H/c \le 4$.

 $P_1 = 0.3 \gamma_c$ ' H $P_w = \gamma_w H = 62.4 H$ $P_q = 0.5 q$

Where:

 $\gamma_{c}' =$ Submerged unit weight of cohesive soil, pcf;

 γ_w = Unit weight of water, pcf;

q = Surcharge load at surface, psf;

 $P_{\bullet} = Lateral pressure, psf;$

 P_1 = Active earth pressure, psf;

 P_q = Horizontal pressure due to surcharge, psf;

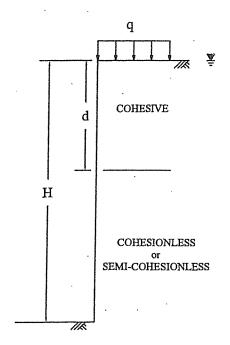
Pw = Hydrostatic pressure due to groundwater, psf;

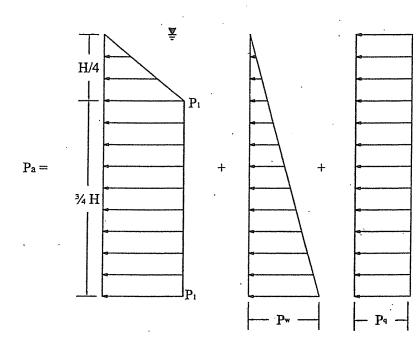
H = Depth of braced excavation, feet

c = Shear strength of cohesion soil, psf;

TRENCH SUPPORT EARTH PRESSURE

SUBMERGED COHESIVE SOIL





TYPICAL SOIL PARAMETERS

BRACED WALL

See Table 2 for typical values of soil parameters

$$\gamma'_{\text{avg}} = \frac{\gamma_{\text{c}}' d + \gamma_{\text{s}}' (\text{H-d})}{\text{H}}$$

$$\begin{split} P_{\text{I}} &= 0.3 \; \gamma'_{\text{fyg}} \; H \\ P_{\text{w}} &= 62.4 \; H \\ P_{\text{q}} &= 0.5 \; q \end{split}$$

Where:

 $\gamma_{c'}$ = Submerged unit weight of cohesive soil, pcf;

 γ_s ' = Submerged unit weight of cohesionless soil, pcf;

 γ'_{avg} = Average submerged unit weight of soils, pcf;

q = Surcharge load at surface, psf;

P. = Lateral pressure, psf;

 P_1 = Active earth pressure, psf;

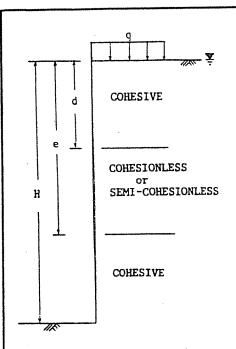
P_q = Horizontal pressure due to surcharge, psf;

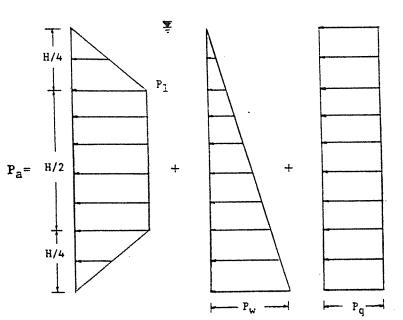
Pw = Hydrostatic pressure due to groundwater, psf;

H = Depth of braced excavation, feet

TRENCH SUPPORT EARTH PRESSURE

SUBMERGED COHESIVE SOIL OVER COHESIONLESS OR SEMI-COHESIONLESS SOIL





TYPICAL SOIL PARAMETERS

BRACED WALL

See Table 2 for typical values of soil parameters

$$P_1 = 0.3 \text{ Y'}_{avg} \text{ H}$$

 $P_w = Y_w \text{ H} = 62.4 \text{ H}$
 $P_q = 0.5_q$

$$\gamma'_{avg} = \frac{\gamma_c' d + \gamma_s' (e-d) + \gamma_c' (H-e)}{H}$$

$$Y_w = 62.4 \text{ pcf}$$

Where:

 $y_{1}' =$ Submerged unit weight of cohesive soil, pcf;

 γ_{i} = Submerged unit weight of cohesionless or semi-cohesionless soil, pcf;

 $\gamma_{...}$ = Unit weight of water, pcf;

 γ'_{m} = Average submerged unit weight of soil, pcf;

q = Surcharge load at surface, psf;

P, = Lateral pressure, psf;

P, = Active earth pressure, psf;

P = Horizontal pressure due to surcharge, psf;

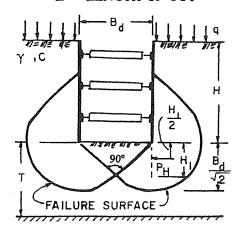
P. = Hydrostatic pressure due to groundwater, psf;

H = Depth of braced excavation, feet

TRENCH SUPPORT EARTH PRESSURE

SUBMERGED COHESIVE SOIL
INTERBEDDED WITH COHESIONLESS OR
SEMI-COHESIONLESS SOIL

CUT IN COHESIVE SOIL, DEPTH OF COHESIVE SOIL UNLIMITED (T>0.7 B_d) L = LENGTH OF CUT



If sheeting terminates at base of cut:

Safety factor,
$$F_s = \frac{N_c C}{\gamma H + q}$$

 N_C = Bearing capacity factor, which depends on dimensions of the excavation : B_d , L and H (use N_C from graph below)

C = Undrained shear strength of clay in failure zone beneath and surrounding base of cut

 γ = Wet unit weight of soil (see Table 2)

q = Surface surcharge (assume q = 500 psf)

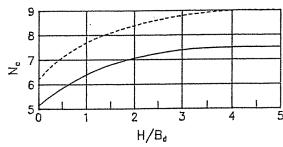
If safety factor is less than 1.5, sheeting or soldier piles must be carried below the base of cut to insure stability - (see note)

$$H_1$$
 = Buried length = $\frac{B_d}{2} \ge 5$ feet

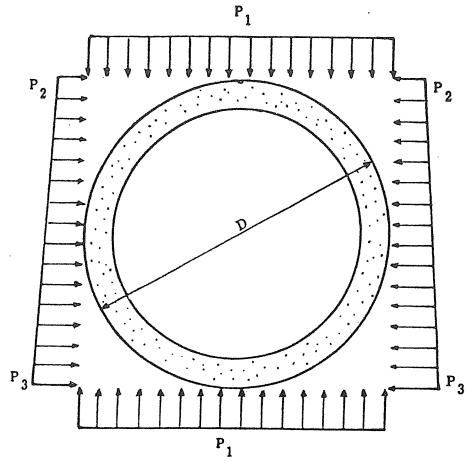
Note: If soldier piles are used, the center to center spacing should not exceed 3 times the width or diameter of soldier pile.

Force on buried length,
$$P_H$$
: diameter $\frac{2}{3} \frac{B_d}{\sqrt{2}}$, $P_H = 0.7 (\gamma HB_d - 1.4CH - \pi CB_d)$ in lbs/ linear foot

If
$$H_1 < \frac{2}{3} \frac{B_d}{\sqrt{2}}$$
, $P_H = 1.5H_1 (\gamma H - \frac{1.4CH}{B_d} - \pi C)$ in lbs/linear foot



For trench excavations For square pit or circle shaft STABILITY OF BOTTOM FOR BRACED CUT



Where: P₁, P₂, P₃ = Tunnel liner load, psf.

D = Tunnel outside diameter, ft.

H = Depth to top of tunnel; ft.

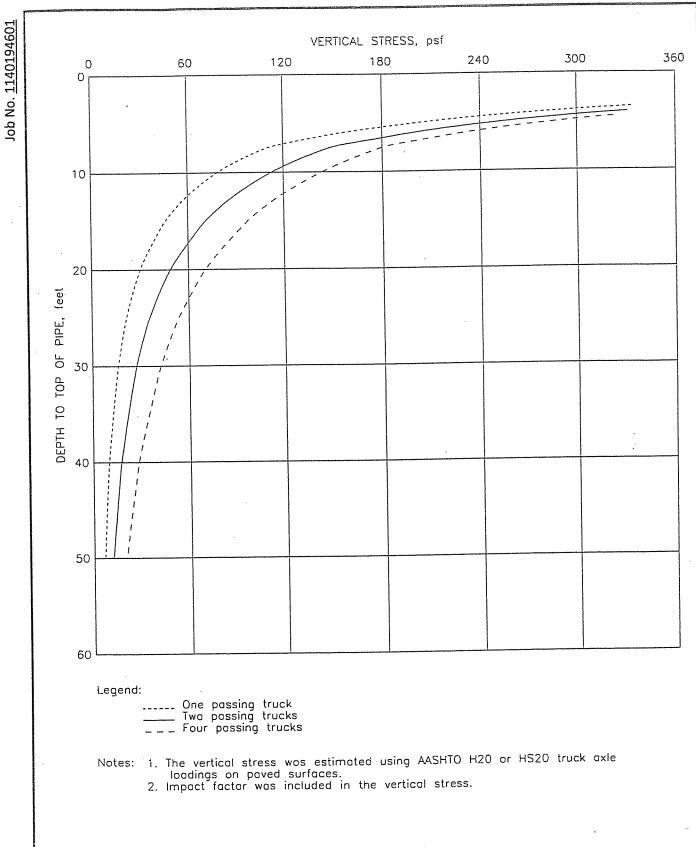
 D_w = Depth to ground water level; ft.

 γ = Wet unit weight of soil, pcf (see Table 3)

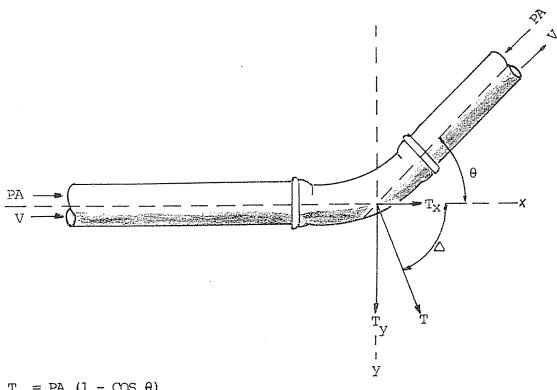
 $Y_{\rm W}$ = Unit weight of water, 62.4 pcf

q_S = Surcharge load, psf.

EARTH PRESSURE ON PIPE AND CASING AUGERING



VERTICAL STRESS ON PIPES DUE TO TRAFFIC LOADS



 $T_{X} = PA (1 - COS \theta)$ $T_{Y} = PA SIN \theta$ $T = 2 PA SIN \frac{\theta}{2}$ $\triangle = (90 - \frac{\theta}{2})$

Where:

T is the resultant force on the bend

 $T_{\mathbf{v}}$ is the component of thrust force in x-direction

T, is the component of thrust force in y-direction

P is the maximum sustained pressure

A is the pipe cross-sectional area

θ is the bend deflection angle

 Δ is the angle between T and X-axis

V is the fluid velocity

THRUST FORCES ACTING ON A BEND

TABLES

	<u>Table</u>
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Geotechnical Design Parameter Summary – Open Cut Excavation (Auger Pits)	2
Geotechnical Design Parameter Summary – Trenchless Installation	
(Pipe and Auger Casing)	3

TABLE 1 SUMMARY OF BORING INFORMATION

Boring No.	Depth (feet)	Street	Northing	Easting	Elevation (feet)
GB-1 (GB-1P)	15	Chadbourne	13844243.94	3046683.66	79.83
GB-2	14	Chadbourne	13844258.25	3047275.18	78.43
GB-3	14	Chadbourne	13844129.71	3047759.34	79.92
GB-4	14	Chadbourne	13844131.38	3048183.83	75.71
GB-5	14	Chadbourne	13844237.05	3048759.23	75.26
GB-6	15	Broadgreen	13843919.24	3046560.45	80.75
GB-7	15	Kickerillo	13843892.19	3047307.15	78.07
GB-8	15	Broadgreen	13843818.17	3047920.47	76.54
GB-9	22	Broadgreen	13843905.80	3048533.39	74.19
GB-10	15	Broadgreen	13843878.34	3049030.75	74.17
GB-11	19	Cindywood	13843664.30	3046957.35	77.48
GB-12	14	Cindywood	13843564.64	3047664.63	72.96
GB-13	17	Cindywood	13843561.43	3048243.29	72.52
GB-14	17	Cindywood	13843607.14	3048763.96	70.14
GB-15	14	Carolcrest	13843355.78	3046709.27	76.94
GB-16	14	Carolcrest	13843362.63	3047243.59	71.98
GB-17	14	Carolcrest	13843243.50	3047920.79	72.50
GB-18	17	Carolcrest	13843321.25	3048601.27	69.37
GB-19	14	Carolcrest	13843131.65	3048991.27	69.55
GB-20	13	Kellywood	13843051.86	3047189.44	71.31
GB-21	13	Kellywood	13842958.31	3047606.37	70.30
GB-22 (GB-22P)	18	Kellywood	13842946.14	3048243.63	68.27
GB-23	13	Rainwood	13844596.67	3048061.66	79.60
GB-24	14	Clear Spring	13844649.15	3048611.17	78.78
GB-25	14	Apple Tree Lane	13844522.69	3049019.26	78.41
GB-26	13	Hickory Post Lane	13841898.46	3048966.06	69.29
GB-27	13	Hickory Post Lane	13842412.61	3048975.57	70.56

TABLE 1 (cont'd) SUMMARY OF BORING INFORMATION

Boring No.	Depth (feet)	Street	Northing	Easting	Elevation (feet)
GB-28	14	Apple Tree Lane	13844373.27	3050343.63	71.66
GB-29	20	Blue Bird Lane	13843979.32	3050478.92	70.94
GB-30	15	Cardinal Lane	13843589.40	3050451.61	70.74
GB-31	15	Cindywood Circle	13843196.35	3050374.35	67.14
GB-32	18	Carolcrest	13842785.19	3050359.24	67.94
GB-33	14	Kellywood Lane	13842469.02	3050530.51	68.84
GB-34	15	River Forest	13841932.22	3050082.07	68.39
GB-35	15	River Forest	13842119.32	3050487.34	68.74
GB-36 (GB-36P)	14	Heatherfield	13841495.30	3050236.19	67.50
GB-37	14	Heatherfield	13841794.36	3050560.07	68.24
GB-38	15	Rancho Bauer	13841480.11	3049425.92	70.91
GB-39	15	Rancho Bauer	13841997.23	3049446.47	71.64
GB-40	15	Rancho Bauer	13842530.31	3049419.47	70.91
GB-41	20	Rancho Bauer	13842978.92	3049396.04	71.74
GB-42	20	Rancho Bauer	13843502.85	3049369.83	71.19
GB-43	20	Rancho Bauer	13843985.76	3049344.49	72.45
GB-44	15	Rancho Bauer	13844503.54	3049319.70	78.45
GB-45	15	White Wing Lane	13842407.41	3049986.91	69.55
GB-46	20	White Wing Lane	13842914.11	3049943.69	69.75
GB-47	15	White Wing Lane	13843409.84	3049930.89	70.79
GB-48	20	White Wing Lane	13843798.31	3050037.51	71.20
GB-49 (GB-49P)	20	White Wing Lane	13844278.18	3050013.93	72.30
GB-50	15	White Wing Lane	13844731.14	3049992.74	74.90

TABLE 2

GEOTECHNICAL DESIGN PARAMETER SUMMARY
OPEN-CUT EXCAVATION (AUGER PITS)

	T.		IEACAVA	1	[<u> </u>	T
Alignments	Boring Nos.	Stratigraphic Unit	Range of Depths, ft	Wet Unit Weight, γ, pcf	Submerged Unit Weight, γ', pcf	Undrained Cohesion, psf	Internal Friction Angle, φ, degree
8" Waterline along Chadbourne Drive	GB-1 thru GB-5	Cohesive	0-10 10-12 12-14	111 128 128	56 66 66	1,500 2,500 1,200	
8" and 6" Waterline along Broadgreen	GB-6, GB-8, GB-10	Cohesive	0-5 5-8 8-14 14-15	125 125 129 129	62 62 65 65	1,200 1,500 1,200 700	
Drive	GB-9	Cohesive Cohesionless Cohesionless Cohesionless Cohesive	0-6 6-12 12-13 13-15 15-17 17-22	130 130 110 120 111 120	65 65 55 58 48 58	4,000 1,500 1,200 1,200	30 30
8" Waterline along Cindywood Drive	GB-11 and GB-12	Cohesive Cohesionless	0-12 12-14 14-19 (GB-11 only)	128 104 111	64 42 48	1,500 	28 32
	GB-13	Cohesive	0-6 6-12 12-17	130 130 129	65 65 67	600 1,800 1,200	40 F0
	GB-14	Cohesive Cohesionless Cohesive	0-8 8-10 10-12 12-14 14-17	132 132 105 118 120	66 70 43 56 58	1,000 800 900 4,000	 25
8" Waterline along Carolcrest Drive	GB-15 thru GB-17 and GB-19	Cohesive	0-14	130	65	1,000	
	GB-18	Cohesive Cohesionless Cohesive	0-8 8-14 14-16 16-17	127 127 111 120	65 65 48 58	2,000 1,200 2,100	 30
8" Waterline along Kellywood Lane	GB-20 thru GB-22	Cohesive	0-14 14-18	129 120	66 58	900 3,500	
6" Waterline along Rainwood Drive	GB-23 and GB-4	Cohesive	0-10 10-14	132 120	66 58	2,000 4,000	

TABLE 2 (cont'd)

GEOTECHNICAL DESIGN PARAMETER SUMMARY OPEN-CUT EXCAVATION (AUGER PITS)

Alignments	Boring Nos.	Stratigraphic Unit	Range of Depths, ft	Wet Unit Weight, γ, Pcf	Submerged Unit Weight, γ', pcf	Undrained Cohesion, psf	Internal Friction Angle, φ, degree
8" Waterline along Clear Spring	GB-24	Cohesive	0-4 4-10 10-12 12-14	131 131 117 117	65 65 59 59	3,000 1,800 900 4,000	
Drive	GB-9	Cohesive Cohesionless Cohesionless Cohesionless Cohesive	0-6 6-12 12-13 13-15 15-17 17-22	130 130 110 120 111 120	65 65 55 58 48 58	4,000 1,500 1,200 1,200	30 30
8" Waterline along Apple Tree Lane	GB-25	Cohesive	0-10 10-12 12-14	127 127 127	64 64 64	2,000 3,000 4,000	
8" Waterline along Hickory Post Lane	GB-26 and GB-27	Cohesive	0-2 2-6 6-13	130 130 130	65 65 65	1,500 3,000 1,500	
8" Waterline along Apple Tree Lane	GB-28 and GB-49	Cohesive	0-14 14-16 (GB-49 only) 16-20 (GB-49 only)	132 136 136	67 73 73	1,500 1,500 2,500	
8" Waterline along Blue Bird Lane	GB-29 and GB-43	Cohesive	0-10 10-14 14-18 18-20	135 135 130 130	67 67 65 65	1,500 1,000 700 3,500	
8" Waterline along Cardinal Lane	GB-30 and GB-42	Cohesive	0-10 10-15 15-20	128 129 129	64 64 64	3,500 1,500 2,000	
8" Waterline along Cindywood Circle	GB-31	Cohesive	0-8 8-15	131 131	65 65	2,000 1,000	
8" Waterline along Carolcrest Drive	GB-32	Cohesive Cohesionless Cohesive	0-6 6-10 10-12 12-18	133 133 97 137	67 67 48 68	2,000 1,000 2,000	 30

TABLE 2 (cont'd)

GEOTECHNICAL DESIGN PARAMETER SUMMARY **OPEN-CUT EXCAVATION (AUGER PITS)**

Alignments	Boring Nos.	Stratigraphic Unit	Range of Depths, ft	Wet Unit Weight, γ, Pcf	Submerged Unit Weight, γ', pcf	Undrained Cohesion, psf	Internal Friction Angle, φ, degree
8" Waterline along Kellywood Lane	GB-33	Cohesive	0-8 8-14	132 132	66 66	2,000 1,000	
8" Waterline along River	GB-34	Cohesive	0-10 10-13 13-15	132 132 132	66 66 66	3,800 1,500 1,000	
Forest Drive	GB-35	Cohesive Cohesionless Cohesive	0-8 8-12 12-13.5 13.5-15	132 132 98 132	66 66 49 66	3,800 2,200 1,500	 30
8" Waterline along Heatherfield Drive	GB-36 and GB-37	Cohesive	0-2 2-10 10-14	134 134 134	67 67 67	800 1,600 2,500	
8" Waterline along Rancho Bauer Drive	GB-38 thru GB-44	Cohesive	0-6 6-13 13-18 18-20	128 132 127 127	64 66 63 63	1,000 1,500 700 2,000	
8" Waterline along White Wing Lane	GB-45 thru GB-50	Cohesive	0-15 15-20	133 130	67 65	1,000 1,500	

Note:1) Cohesive soils include Sandy Lean Clay, Lean Clay w/sand, Lean Clay, Fat Clay w/sand and Fat Clay. 2) Cohesionless soils include Silty Sand, Sandy Silt, Clayey Silt, and Silt w/sand.

TABLE 3

GEOTECHNICAL DESIGN PARAMETER SUMMARY
TRENCHLESS INSTALLATION

PROPERTY	COHESIVE SOILS ⁽¹⁾	COHESIONLESS SOILS ⁽²⁾
Wet Unit Weight, γ, pcf		
0-6	130	
6-10	132	
10-12	130	101 (GB-14 and GB-32 only)
12-14	130	104 (GB-9, GB-11, GB-12 and GB-35 only)
14-16	130	111 (GB-18 only)
16-18	128	111 (GB-9 only)
18-20	127	
20-22	120	
Submerged Unit Weight, γ', pcf		
0-6	65	
6-10	66	
10-12	65	51 (GB-14 and GB-32 only)
12-14	65	42 (GB-9, GB-11, GB-12 and GB-35 only)
14-16	65	49 (GB-18 only)
16-18	66	49 (GB-9 only)
18-20	65	
20-22	58	
Moisture Content (%)		
0-6	15	
6-10	17	
10-12	20	15 (GB-14 and GB-32 only)
12-14	19	18 (GB-9, GB-11, GB-12 and GB-35 only)
14-16	17	26 (GB-18 only)
16-18	18	23 (GB-9 only)
18-20	20	
20-22	18	w ea
	UNDRAINED PR	OPERTIES
Undrained Cohesion, Cu, psf		
1-6*	600	
6-10*	1,000	
10-12*	900	
12-14*	900	
14-16*	700	
16-18*	700	
18-20*	1,500	
Angle of Internal Friction, φ,		
degrees 1-6*		
6-10*		ww.
10-12*	•••	30 (GB-14 and GB-32 only)
12-14*		30 (GB-9, GB-11, GB-12 and GB-35 only)
14-16*		30 (GB-18 only)
16-18*		30 (GB-9 only)
18-20*		

TABLE 3 (cont'd)

GEOTECHNICAL DESIGN PARAMETER SUMMARY TRENCHLESS INSTALLATION

		ENCHLESS INST	
PROPERTY		COHESIVE	COHESIONLESS SOILS ⁽²⁾
		SOILS ⁽¹⁾	ODED MINO
Flastic Modulus E maf		UNDRAINED PR	UPEKITES
Elastic Modulus, E, psf	1-6*	100.000	
	1-0" 6-10*	180,000	
	10-12*	300,000	129 000 (CD 14 and CD 22 only)
	12-14*	270,000	128,000 (GB-14 and GB-32 only) 112,000 (GB-9, GB-11, GB-12 and GB-35 only)
	12-14" 14-16*	270,000 210,000	112,000 (GB-9, GB-11, GB-12 and GB-33 only) 152,000 (GB-18 only)
	16-18*	210,000	216,000 (GB-9 only)
	18-20*	600,000	210,000 (GB-9 only)
Coefficient of Lateral Earth	10-20	000,000	
Pressure at Rest, K _o ,	1-6*	1.2	
ressure at Rest, Ro,	6-10*	1.2	
	10-12*	1.2	0.5 (GB-14 and GB-32 only)
	12-14*	1.2	0.5 (GB-9, GB-11, GB-12 and GB-35 only)
	14-16*	1.2	0.5 (GB-17, GB-12 and GB-33 only)
	16-18*	1.2	0.5 (GB-9 only)
	18-20*	1.2	0.5 (GD 7 only)
Poisson's Ratio, μ	10 20	0.45	0.3
1 0133011 3 Γαμίο, μ		DRAINED PRO	
Drained Cohesion, C', psf		DRAMAED I RO	
Brained Concilon, C, psi	1-6*	0	
	6-10*	0	
	10-12*	0	
	12-14*	0	es to
	14-16*	0	
	16-18*	0	<u></u>
	18-20*	0	
Angle of Internal Friction, φ',			
degrees	1-6*	23	
	6-10*	23	
	10-12*	24	30 (GB-14 and GB-32 only)
	12-14*	24	30 (GB-9, GB-11, GB-12 and GB-35 only)
	14-16*	22	30 (GB-18 only)
	16-18*	22	30 (GB-9 only)
	18-20*	26	
Elastic Modulus, E, psf			
	1-6*	108,000	
	6-10*	180,000	
	10-12*	162,000	128,000 (GB-14 and GB-32 only)
	12-14*	162,000	112,000 (GB-9, GB-11, GB-12 and GB-35 only)
	14-16*	126,000	152,000 (GB-18 only)
	16-18*	126,000	216,000 (GB-9 only)
	18-20*	360,000	••

Notes: 1. Cohesive soils include Fat Clay, Fat Clay with sand, Lean Clay, Lean Clay with sand and Sandy Lean Clay.

- 2. Cohesionless soil includes Sandy Silt, Clayey Silt, Silty Sand and Silt w/sand.
- * Tunnel zone which includes invert depth plus 6 feet above invert plus 6 feet below invert.

APPENDIX A

	<u>Figure</u>
Log of Borings	A-1 thru A-50
Symbols and Terms Used on Boring Logs	A-51
Piezometer Installation Reports	A-52 thru A-55

PR	DJEC	Γ:	COH Water Line Re	LOG OF BORII			GD.	I	·			NO.	: 1	1401	9460) 1
LOC	CATIO	N :	WBS No. S-000035 Houston, Texas N 13844243.94, E	3046683 66						СОМ	PLET	ION	DEP1	ΓH :	15.0	F
SU	RFACI	E EL	Chadbourne Dr.; Se VATION: 79.83 FT.	e Plan of Borings	(Figur	e 2.	1)			DATE	Ξ: (05-C	6-1	3		
			SAMPLER : Shelby	Tube/Split Spoon	NO NO NO	U		ш			24	UNDR	AINED	SHEAR TSF	STRE	.NC
FEET	ᆸ	_		0.0 TO 15.0 FT.	ETRA PER P	ASSIN	EIGH	STUR %	%	"⊥, %	INDEX,	Он	ND PE	NETRO	METER	
ON	4, FEET	SYMBOL	DRY AUGER : WET ROTARY :	TO FT.	PEN WS P	P 002	PCF ×	MOI TENT,	LIMIT	<u> </u>		_		NED CO		
ELEVATION,	ОЕРТН,	S		OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	רומחום רואוד,	PLASTIC LIMIT,	LASTICITY		RVANE	COMPR	ESSION	V.
				OI WATEROL	STAN	Д.	۵	, A		<u>a</u>	5			1.5	2.0	2.
79.8- 79.4-		0.6.0	√5.5" Concrete	**************************************	Д											
			Very stiff to har brown LEAN CL	rd gray and AY (CL)				15					2	7	C)
			w/sand	` '												
			—w/ferrous stail ferrous nodul					12						4)
	- 5-		-hard 4'-6' -w/calcareous	nodules 4'-8'		72	122	12	43	16	27				$\frac{1}{4}$ C	<u></u>
			-reddish brown	and gray							_				1	,
71.8-		777	6'-8'	······································				21						2	7 0)
			Very stiff to hai brown and gra	rd reddish v FAT CLAY												
	- 10-		(CH), slickensid	ded		93	103	23	71	26	45		_		ЦС	
			w/calcareous a nodules	and terrous				23								
								25)
:								29)
64.8-	- 15-							23							40	
			NOTE :													
			See Piezomet	er GB-1P for					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
	~		water level m	easurements.												
	- 20-															
	- 20-										j					
		ļ														
	- 25-		7													_
	- 30-													_		
	- 35-															
DEPT	H TO	WATE	R IN BORING :	JRING DRILLING. OPEN TO 15.0 FT.												

				LOG OF BORIN	G N	10.	GB-	-2				
	PRC	JECT	:	COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3	lo A	rea				PRO	JECT	NO.: 1140194601
	LOC	OITA	١: ٧	Houston, Texas N 13844258.25, E 3047275.18 Chadhaurna Dr.: Saa Plan of Parings (E:aux		1\			СОМ	PLE	TION DEPTH : 14.0 FT
	SUR	RFACE	ELI	Chadbourne Dr.; See Plan of Borings (EVATION: 78.43 FT.	1	T	' <i>)</i>			DATE	Ξ:	05-06-13
	28. ELEVATION, FEET	і ОЕРТН, FEET Р	SYMBOL SYMBOL	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOO	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT,	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH TSF O HAND PENETROMETER UNCONSOLIDATED—UNDRAIN TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
-	78.4 78.0-			Jo. o outcrete								
		- 5-		Very stiff yellowish brown and gray LEAN CLAY (CL) w/sand, ferrous stains and ferrous nodules -w/calcareous nodules 4'-10'				16				ΔΟ
					With the second			15				40
				-reddish brown and gray 8'-10'	***************************************	79	108	19 19	44	16	28	
_	68.4	- 10-		Very stiff reddish brown and gray FAT CLAY (CH) w/calcareous nodules				30				
	64.4	- 15-		Stiff to very stiff reddish brown and gray LEAN CLAY (CL) w/sand, calcareous nodules and ferrous stains				17				
		- 20-										
		- 25-										
	 - - -	- 30-										
			THE THE PARTY OF T									
		- 35-										
:	NO	H TO GRO LE OF	UNDW	R IN BORING: VATER ENCOUNTERED DURING DRILLING. FO 14.0 FT. AT END OF DRILLING.	o proje	'n a	I~					

PROJECT : COH Water Line Replacement in Kickerillo Area		-3								
WBS No. <u>\$</u> -000035-0185-3				PRO	JECT	NO. :	114	0194	601	
Houston, Texas LOCATION: N 13844129.71, E 3047759.34 Chadbourne Dr.; See Plan of Borings (Figure 2 SURFACE ELEVATION: 79.92 FT.	11			СОМ	PLE	TION DE	PTH	: 14	1.0	FT.
SURFACE ELEVATION: 79.92 FT.	2.1)	,		DATE	: :	05-06-	-13			
SYMBOL STANDARD PENETRATION OF WATERIAL PRESSING OF STANDARD PENETRATION OF WATERIAL PASSING OF STANDARD PENET	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	△ TORVA	TS PENET NFINED NSOLIDA AL COM	F ROMET COMF ATED- MPRES	ER PRESS UNDR SION	ION AINE
- 79.9 0 0 5.5" Concrete										
Stiff to very stiff gray and brown SANDY LEAN CLAY (CL) w/ferrous stains and sand seams -very stiff to hard 2'-4' -w/ferrous nodules 2'-10'		13				Δ	0	Δ	0	
-yellowish gray and brown 4'-6' -very stiff 4'-8'	0	14	42	14	28			70		
-w/vertical sand seams and calcareous nodules 8'-10'		15					\downarrow	0		
Very stiff gray and reddish brown FAT CLAY (CH) w/sand	7 103	17 25	59	23	36			D		
seams		31						S		
- 15-										
- 20-										
- 25-										
- 30-										
- 35-										
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING. Geotest Engineering	<u></u>	L			!			****		

			LOG OF	BORING	G N	0.	GB-	-4							
F	PROJECT	V	COH Woter Line Replacement in VBS No. S-000035-0185-3	Kickeril	lo A	rea			.,	PRO	JECT	NO. :	1140	1946	501
	_OCATION	-1 14 • 1	touston, Texas v 1384413138 F 304818383	vringe (-:	<u>م</u> 2	1)			СОМ	IPLE	TION DE	PTH :	: 14.	O FT.
5	SURFACE	ELE/	Chadbourne Dr.; See Plan of Bo VATION : 75.71 FT.	migs (,	' /			DAT	E :	05-06-			
ELEVATION, FEET	DEPTH, FEET	SYMBOL	SAMPLER: Shelby Tube/Split Sp DRY AUGER: 0.0 TO 14.0 WET ROTARY: TO DESCRIPTION OF MATERIAL	FT.	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	△ TORVA	TSP PENETR NFINED NSOLIDA AL COM NE	COMETE COMPR TED-U PRESSI	R ESSION NDRAINEI ON
- 75 - 75	.7 0	0.7.0	√5.5" Concrete	Г	등							0.5	0 1.5	2.0	2.5
- 69 - 61.	- 5-		Very stiff yellowish brown and gray LEAN CLAY (CL) w/ferrous stains, sand and calcareous and ferrous nodules -stiff to very stiff w/vertical sand seams 2'-4' -gray and reddish brown 4'-6' Very stiff gray and reddish brown FAT CLAY (CH) w/se seams -hard 8'-14'			98	112	15 17 22 24 25 18 21	63	24	39				
			! IN BORING :	Material section of the Control of t											
	NO GROU	AWONL	NTER ENCOUNTERED DURING DRILLING 14.0 FT. AT END OF DRILLING. Geotest E		eeri	ing,	Ιγ	ic.							

			LOG OF BORIN	G N	0.	GB-	-5	***************************************				
PRO	OJECT	,	COH Water Line Replacement in Kickeril WBS No. S-000035-0185-3	lo A	rea				PRO	JECT	NO. : 114	0194601
LOC SUF	CATIOI RFACE	N : E ELE	Houston, Texas N 13844237.05, E 3048759.23 Chadbourne Dr.; See Plan of Borings (I VATION : 75.26 FT.	-igur	e 2.	1)					TION DEPTH 05-06-13	: 14.0 FT
54 ELEVATION, FEET	рертн, <u>ғеет</u> Р	SYMBOL SAMPI FS	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHITS O HAND PENET UNCONFINED UNCONSOLID. TRIAXIAL CON A TORVANE 0.5 1.0 1.	ROMETER COMPRESSIOI ATED—UNDRAIN MPRESSION
75.3- 74.7-		0.4.0	√6.25" Concrete Stiff dark gray FAT CLAY				23				40	
			(CH) w/sand seams —gray 2'—4' —w/ferrous nodules 2'—8' —very stiff 4'—6'		87		20	52	21	31		
	- 5-		-w/calcareous nodules and ferrous stains 4'-14'-stiff to very stiff 6'-10'-gray and reddish brown				19					
	- 10-		6'-14' -hard 10'-14'	THE STATE OF THE S	97	105	19 21	55	22	33	04	
			-Hara 10 - 14				22					40
61.3-	- 15-						20					40
	- 20-											
	- 25-											
	- 30-	and accommongs over the second										
		A STATE OF THE STA										
A. An an annual section of the secti	- 35-											
NC) GRO	WATER UNDW/ PEN T	R IN BORING: ATER ENCOUNTERED DURING DRILLING. O 14.0 FT. AT END OF DRILLING. ———————————————————————————————————									

PROJECT : COH Water Line Replacement in Kickerillo Area WIS No. S-000035-0185-3 LOCATION : No. 138439 22.5 € 504656.45 SURFACE ELEVATION : 20.75 FT.				LOG OF BORIN			GB-	-6						
SURFACE ELEVATION: N 13843919.24, £ 3046560.45 SURFACE ELEVATION: 80.75 FT. SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. DESCRIPTION OF MATERIAL BOLD STATE : 05-06-13 SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. DESCRIPTION OF MATERIAL BOLD STATE : 05-06-13 SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY:TOFT. DESCRIPTION OF MATERIAL SHIFT to very stiff dark gray LEAN CLAY (CL) W/sand, ferrous nodules and ferrous stolinsstiff 2-4'-4' -very stiff yellowish brown and gray w/colcoreous nodules 4'-8' -very stiff to very stiff gray and reddish brown FAT CLAY (CH) w/sand seams and calcareous nodulesslickensided 8'-10'hard 10'-15' STIFF to very stiff gray and reddish brown FAT CLAY (CH) w/sand seams and calcareous nodulesslickensided 8'-10'hard 10'-15' STIFF to very stiff gray and reddish brown FAT CLAY (CH) w/sand seams and calcareous nodulesslickensided 8'-10'hard 10'-15'	PRO	DJEC.	Γ:	WBS No. S-000035-0185-3	lo A	rea				PRO	JECT	NO. : 1	14019	4601
SAMPLER : Shelby Tube/Spit Spoon DRY AUGER : 0.0 TO 15.0 FT. DRY AUGER : 0.0 TO 15.0 FT. DRY AUGER : 0.0 TO 15.0 FT. DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL DRY AUGER : 0.0 TO 15.0	LOC SUF	CATIO:	N : E EL	N 13843919.24, E 3046560.45 Broadgreen Dr.; See Plan of Borings (F EVATION : 80.75 FT.	igur	e 2.	1)							5.0 F
Stiff to very stiff dark gray LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains —stiff 2'-4' —very stiff yellowish brown and gray w/colcareous nodules 4'-8' Stiff to very stiff gray and reddish brown FAT CLAY (CH) w/sand seams and colcareous nodules —slickensided 8'-10' —hard 10'-15' 65.8-15-	ELEVATION,	ОЕРТН,		DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %				O HAND PE UNCONFII UNCONSC TRIAXIAL TORVANE	NETROME NED COM DLIDATED- COMPRES	TER PRESSIO -UNDRAII SSION
Stiff to very stiff gray and reddish brown FAT CLAY (CH) w/sand seams and calcareous nodules —slickensided 8'-10' —hard 10'-15'	80.3-			Stiff to very stiff dark gray LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains -stiff 2'-4' -very stiff yellowish brown and gray w/calcareous		76	104	20 18	49	19	30			
65.8 15 22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	72.8-	- 10-		and reddish brown FAT CLAY (CH) w/sand seams and calcareous nodules -slickensided 8'-10'		91	102	25 25	64	25	39			
	65.8	- 20-						22						

				LOG OF BORIN	G N	0.	GB-	-7				***************************************			
PR	OJEC ⁻	Γ:	W	OH Water Line Replacement in Kickeri /BS No. S-000035-0185-3	lo A	rea				PRO	JECT	NO. :	1140	1946	501
LOG	CATIO	N :	- 1	louston, Texas 13843892.19, E 3047307.15 ickerillo Dr.: See Plan of Borings (Fig.	iro '	2 1 \				СОМ	PLE.	TION DEF	: HT	15.	O FT.
SUI	RFACE	E EL	E\	ickerillo Dr.; See Plan of Borings (Fig 'ATION : 78.07 FT.	·		1			DATE	= : (05-06-			
ELEVATION, FEET	DEPTH, FEET	SYMBOL	SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	LASTICITY INDEX, %	UNDRAINEI O HAND F UNCON! TRIAXIAI TORVAN	TSF PENETRO FINED O SOLIDAT COMP	OMETE COMPR	R ESSION
- 78.1- - 77.6-	- 0-	0.9.0			STAN	u.	۵	Ϋ́		о.		0.5 1.		2.0	2.5
- 77.6-				Toncrete Hard red, yellowish brown and gray LEAN CLAY (CL) w/sand and ferrous nodules and ferrous stains	***************************************			12 13					en e		
	- 5-			-very stiff 6'-8'		80		14	46	20	26			4	
- 70.1-	10-			Very stiff reddish brown and groy FAT CLAY (CH) w/sand seams, ferrous stains and calcareous		90	102	22	75	28	47			0	
- 66.1-				nodules Stiff to very stiff reddish				23					4		
- 63.1-	15-			brown and gray LEAN CLAY (CL) w/silt and sand seams	ANALYSIS OF THE PROPERTY OF TH			21 22				0			
	- 20-								:						
	- 25-														
	- 30-														
	- 35-														
NO		DND'	WΑ	IN BORING: TER ENCOUNTERED DURING DRILLING. 15.0 FT. AT END OF DRILLING. ———————————————————————————————————	 eeri	ing	Ι	nc.							

				LOG OF BORIN	G N	0.	GB-	-8				
	PRO	DJECT	;	COH Water Line Replacement in Kickeril WBS No. S-000035-0185-3	lo A	rea				PRO	JEC	NO.: 1140194601
	LOC	CATIO	N :	Houston, Texas N 13843818.17, E 3047920.47	••	0	4.\			COM	(PLE	TION DEPTH : 15.0 FT.
	SUF	RFACE	EEL	Broadgreen Dr.; See Plan of Borings (FEVATION: 76.54 FT.	,	e 2.	1)	,,		DAT	E :	05-06-13
	ELEVATION, FEET	рертн, геет		SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
F	76.5- 76.1-	- 0-	0.9.0.	¬5.5" Concrete ∫								
	en porte e partie e partie en p	- 5-		Stiff dark gray FAT CLAY (CH) w/sand and ferrous nodules -gray 2'-4' -groy and brown 4'-8' -very stiff w/calcareous nodules 4'-10'		79	110	23 21 20	57	17	40	
	66.5	- 10-		-gray and reddish brown w/sand seams 8'-10' Very stiff gray and reddish				24 24				AD
				brown LEAN CLAY (CL) w/silt and sand seams -stiff 14'-15'		90	106	23 20	46	21	25	■ ○
		- 20- - 25- - 30- - 35-	WATE	R IN BORING :				21				
	NO		UNDV	ATER ENCOUNTERED DURING DRILLING.	er:	ing,	ΙΥ	ıc.				

PRO	OJECT	Γ:	LOG OF BORING COH Water Line Replacement in Kickeril			GB-	-9	************	PRO	JECT	NO.	: 11	40194	1601
LOC	CATIOI RFACE	NI +	WBS No. S-000035-0185-3 Houston, Texas N 13843905.80, E 3048533.39 Broadgreen Dr.; See Plan of Borings (F EVATION: 74.19 FT.	igure	e 2.	1)					ΓΙΟΝ [05-07		l : 22	2.0 F
- 24.5 -2.5-4 -2.5-4 -2.5-4 -2.5-4 -2.5-4 -3.6-4 -3.6-4 -3.6-4 -4.6-4 -6	DEPTH, FEET	SYMBOL The SYMBOL	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 12.0 FT. WET ROTARY: 12.0 TO 22.0 FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	O HAN UNC TRIA TOR	ID PENE CONFINE CONSOLI XXIAL CO	TSF ETROME D COMI DATED- OMPRES	TER PRESSIO UNDRA SION
- 73.6- - 72.2-	- 5-		T'' Concrete Brown SANDY LEAN CLAY (CL) Hard gray and brown FAT CLAY (CH) w/calcareous and ferrous nodules and ferrous stains -stiff to very stiff 6'-8'				15 14 13							04
- 64.2-	10-		-very stiff 8'-10' Stiff yellowish gray and	as a d. unastantenentenentenentenentenentenentene	90	111	17 20	60	24	36			A	
- 62.2- - 61.2-	45		brown SANDY LEAN CLAY (CL) w/ferrous nodules and clayey sand seams Gray SILTY SAND (SM) Stiff to very stiff gray		50		19 20 19				(
- 59.2- - 57.2-	15-		and brown SANDY LÉAN CLAY (CL) w/sand layer Medium dense reddish brown CLAYEY SILT (ML) w/silt seams	27	91	106	23 20	27	21	6		7	0	
- 52.2-	- 20-		Stiff to very stiff reddish brown SILTY CLAY (CL-ML) w/calcareous nodules -w/sand stone 17'-18'	AND			18						0	
	- 25-			AND THE PROPERTY OF THE PROPER										
	- 30-													

			LOG OF BORIN	IG N	10.	GB-	-10				
PRO	DJECT		COH Water Line Replacement in Kicker WBS No. S-000035-0185-3	illo A	rea				PRO	JEC	Г NO. : 1140194601
LOC	CATIO	VI -	Houston, Texas N 13843878.34, E 3049030.75 Broadgreen Dr.; See Plan of Borings (VATION : 74.17 FT.	Figur	e 2.	1)					TION DEPTH : 15.0 FT.
SUF	RFACE	ELE	VATION : 74.17 FT.	T = E	1	, 			DATE		05-06-13
ELEVATION, FEET	ОЕРТН, FEET	SYMBOL	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOO	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	LASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED—UNDRAINE TRIAXIAL COMPRESSION A TORVANE
74.2- 73.7-	- 0-	0.9.0		STA			ž		LL.	<u>ď</u>	0.5 1.0 1.5 2.0 2.5
/3./-	- 5-		O" Concrete Very stiff dark gray LEAN CLAY (CL) w/sand, ferrous nadules and ferrous stains —gray 2'—4' —yellowish brown and gray w/calcareous nodules 4'—8'				17 16				ΔΦ Δ Ο
							19				
66.2-			Stiff to very stiff yellowish brown and gray		82	106	22	53	22	31	40
	- 10-		FAT CLAY (CH) w/sand, ferrous stains and calcareous nodules		02	,00		23	22	JI	
62.2- 59.2-	- 15-		Stiff reddish brown and gray LEAN CLAY (CL) w/silt seams and —medium stiff very silty clay w/clay stone 14'-15'				21 21 23				AD A
	- 20-										
	- 30-									;	
	- 35-	***************************************									
NO		UNDW	R IN BORING : ATER ENCOUNTERED DURING DRILLING. O 15.0 FT. AT END OF DRILLING.					•			

	OJEC ⁻		COH Water Line Replacement in Kicker WBS No. S-000035-0185-3 Houston, Texas						PRO	JEC1	Г NO. :	1140	19460) 1
LO SU	CATIO RFACI	N : E ELI	N 13843664.30, E 3046957.35 Cindywood Dr.; See Plan of Borings (F EVATION : 77.48 FT.	igure	2.1)					TION DE 05-02-		: 19.0	F
5.22 ELEVATION, FEET			SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: 14.0 TO 19.0 FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	רוסחום רואוז, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINE O HAND UNCON TRIAXII TORVA 0.5 1	PENETR NFINED NSOLIDA AL COM NE	ROMETER COMPRES	SSIO DRA N
76.7-		0.00	9" Concrete Very stiff to hard yellowish brown and gray LEAN CLAY (CL) w/sand, ferrous nodules and		and the consequence of the conse		14					4		
73.5	- 5-		ferrous stains Very stiff reddish brown and gray FAT CLAY (CH) w/sand, calcareous nodules and silt seams -slickensided 4'-6' -stiff to very stiff 6'-10'		84	102	26 28	61	25	36				
67.5- 65.5-	10-		Very stiff to hard reddish brown and gray LEAN CLAY (CL) w/calcareous nodules Medium dense gray and reddish brown SANDY SILT	12	66		31 18 21						0	
58.5-	- 15-		(ML) w/clay seams very dense w/clay stone 17.5'-19'	100 4.5"			19							
	- 30-													

PROJECT : COH Water Line Replacement in Kickerillo Area WES No. 3-000035-0135-3 LOCATION : N 1384356 Sep 20 of 1864.63 SURFACE ELEVATION : 72.96 FT. DEY ALGER : 0.0 To 12.0 FT. WET ROTARY : 12.0 To 14.0 FT. DESCRIPTION OF MATERIAL 9" Concrete Yeary stiff gray LEAN CLAY (CL) w/sond, ferrous stoins -stiff to very stiff gray Lean Clay (CL) w/sond, ferrous stoins -stiff to very stiff gray Lean Clay (CL) w/sond, ferrous stoins -very stiff 6-B Stiff reddish brown CLAYEY SILT (WL) w/silt stoine -w/silt to stiff 10" 10" 12" Reddish brown CLAYEY SILT (WL) w/silt stoine -w/silt stoine -w/silt stoine -w/silt stoine -w/silt stoine -w/silt stoine -w/silt to stiff 10" 10" 12" Reddish brown CLAYEY SILT (WL) w/silt stoine -w/silt stoine				LOG OF BORIN	G N	Ю.	GB-	-12								
DOCATION N 13843564,64 E 3047664,63 SURFACE ELEVATION 72,96 FI. SAMPLER Shelby Tute/Split Spoon DRY AUGER 0.0 To 12.0 FT. DESCRIPTION OF MATERIAL DESCRIPTION OF MATERIAL ODER ST.	PR	OJEC	1	WBS No. S-000035-0185-3	llo A	rea				PRO	JEC1	NO. :	1140)194	601	
SAMPLER : Shelty Tube/Spill Soon DRY AUGER : 0.0 TO 12.0 FT. See	LO	CATIO	H N : 1 (Houston, lexas N 13843564.64, E 3047664.63 Dindywood Dr.: See Plan of Borinas (F	aure	2.1)			СОМ	PLE	TION DE	PTH	: 14	.0 F	т.
9" Concrete Very stiff gray LEAN CLAY (CL) w/sand, ferrous nadules and ferrous stains -stiff to very stiff w/colcareous nodules 2'-4' Stiff reddish brown FAT CLAY (CH) w/sand, calcareous nodules and ferrous stains -very stiff 6'-8' Stiff to very stiff reddish brown and gray SILTY CLAY (CL-ML) w/silt seams and calcareous nodules -medium stiff to stiff 10'-12' Reddish brown CLAYEY SILT (ML) w/silt stone -w/silty clay 13.5'-14' - 20- - 35-	SUI	RFACI	E ELE	VATIÓN : 72.96 FT.		1	, 			DATE				AD CT	DENC	
9" Concrete Very stiff gray LEAN CLAY (CL) w/sand, ferrous nadules and ferrous stains -stiff to very stiff w/colcareous nodules 2'-4' Stiff reddish brown FAT CLAY (CH) w/sand, calcareous nodules and ferrous stains -very stiff 6'-8' Stiff to very stiff reddish brown and gray SILTY CLAY (CL-ML) w/silt seams and calcareous nodules -medium stiff to stiff 10'-12' Reddish brown CLAYEY SILT (ML) w/silt stone -w/silty clay 13.5'-14' - 20- - 35-	EVATION, FEET	ЭЕРТН, FEET	SYMBOL	DRY AUGER: 0.0 TO 12.0 FT. WET ROTARY: 12.0 TO 14.0 FT.	DARD PENETRATIO BLOWS PER FOO	ERCENT PASSING VO. 200 SIEVE	RY UNIT WEIGHT, PCF	URAL MOISTURE CONTENT, %		LIMIT,	INDEX,	O HAND UNCO UNCO TRIAX	TSI PENETI NFINED NSOLIDA AL COM	F ROMETE COMP	ER RESSIC	ИC
Very stiff gray LEAN CLAY (CL) w/sand, ferrous stains -stiff to very stiff w/sand, calcareous nodules and ferrous stains -very stiff 6'-8' Stiff to very stiff reddish brown and gray SILTY CLAY (CL-ML) w/silt seams and calcareous nodules -medium stiff to stiff 10'-12' Seadish brown CLAYEY SILT (ML) w/silt stone -w/silty clay 13.5'-14'		1	A. V. V.		STAN TEST,	82	Q	NAT	Ë	<u>я</u>				5 2.0	2.5	<u> </u>
(CL) w/sand, ferrous stains -stiff to very stiff w/calcareous nodules 2'-4' Stiff reddish brown FAT CLAY (CH) w/sand, calcareous nodules and ferrous stains -very stiff 6'-8' Stiff to very stiff reddish brown and gray SILTY CLAY (CL)—M.L) w/silt seams and calcareous nodules -medium stiff to stiff 10'-12' Reddish brown CLAYEY SILT (M.L) w/silt stone -w/silty clay 13.5'-14'		-	22	L	-											
Stiff reddish brown FAT CLAY (CH) w/sand, calcareous nodules and ferrous stains —very stiff 6'-B' Stiff to very stiff reddish brown and gray SILTY CLAY (CL-ML) w/silt seams and calcareous nodules —medium stiff to stiff 10'-12' Reddish brown CLAYEY SILT (ML) w/silt stone —w/silty clay 13.5'-14'	69.0-			(CL) w/sand, ferrous nodules and ferrous stains —stiff to very stiff										A A A A A A A A A A A A A A A A A A A		
Stiff to very stiff reddish brown and gray SILTY CLAY (CL_ML) w/silt seams and calcareous nodules — medium stiff to stiff 10 – 15 — Reddish brown CLAYEY SILT (ML) w/silt stone — w/silty clay 13.5'—14' — 25- — 35- — 35-	65.0-	- 5		CLAY (CH) w/sand, calcareous nodules and ferrous stains		84	101		64	25	39					
colcoreous nodules -medium stiff to stiff 10'-12' Reddish brown CLAYEY SILT (ML) w/silt stone -w/silty clay 13.5'-14'		- 10-		Stiff to very stiff reddish brown and gray SILTY CLAY		PPT-T-LOW CASE-CONTRACTOR OF STATE CONTRACTOR		21								
- 15- (ML) w/silty stone -w/silty clay 13.5'-14' - 20 30 30 35-	61.0-			calcareous nodules ——medium stiff to stiff			114	22				4				
- 25- - 30- - 35-	59.0-	- 15-		(ML) w/silt stone				19								-
- 30-		- 20-														
- 35-		- 25-				-										
- 35-														A STATE OF THE STA		
		- 30-														_
		- 35-														
																-

PRO	OJECT	Г;	COH Wate	er Line Rep	olacement	F BORII			GB-	<u> </u>		PRO	JECT	NO	. :	1140	0194	601
LO(SUI	CATIOI RFACE	N : E ELI	Houston, N 13843	S-000035 Texas 561.43, E d Dr.; See 72.52 FT.	3048243.2	29 Borings (1	-igure	2.1)				IPLET				: 17	.O F
- -55'2 ELEVATION, FEET	DEPTH, FEET		DRY A	.ER : Shelby .UGER : (ROTARY : 1: DESCRIPTION	0.0 TO 12 2.0 TO 17	.0 FT.	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	O H. U T A TO	AND F NCONS NCONS RIAXIAL DRVAN	PENETF FINED SOLIDA COM	CAR ST F ROMETI COMPI TED-L IPRESS	ER RESSI JNDRA SION
71.9-		D D D	FILL: r gray and -w/ve	Concrete medium st fat clay v ferrous no rtical san	v/calcare dules		,			20 27				04	2		CONTRACTOR OF ANY PROPERTY AND ANY CONTRACTOR OF THE STATE OF THE STAT	
66.5-	- 5-		-medi and -stiff Stiff to	5"—8' um stiff t brown 2' reddish b b hard grosh brown	—4' rown 4'—6 ay and	5'		93	100	19	54	22	32	Ø	Q)
62.5-	10-		(CH) stains nodul -slicke	w/sand s s and calo	seams, fe careous					25 22					4	7		
	- 15-		and w/ca sand —stiff	tiff reddis gray LEAN Icareous r seams to very s	CLAY (C nodules a tiff w/silt	nd		95	107	21	29	20	9		1			
55.5-	- 20-		-stiff -gray	rs 12'-14 14'-16' sand 15. to hard w -17'	7'-16'	ne 		7		14		TARIHAMAN MARIAMAN MARIAMAN AMARIAMAN AMARIAMAN MARIAMAN MARIAMAN MARIAMAN MARIAMAN MARIAMAN MARIAMAN MARIAMAN			Δ			0
	- 25-																	
	- 30-																	
		A																

					LOG OF BORIN	G N	0.	GB-	-14				
	PRO.	JECT	:	W	OH Water Line Replacement in Kickeri /BS No. S-000035-0185-3	lo A	rea				PRO	JECT	NO.: 1140194601
	LOCA	IOITA	١ :	N	ouston, Texas 13843607.14, E 3048763.96 indywood Dr.: See Plan of Borings (Fi	aure	2 1	١			СОМ	IPLE	TION DEPTH : 17.0 FT
	SURI	FACE	EL	EV.	indywood Dr.; See Plan of Borings (Fi 'ATION: 70.14 FT.	,		, 			DATE	<u>:</u>	05-06-13
1	C ELEVATION, FEET	р ОЕРТН, FEET		SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 12.0 FT. WET ROTARY: 12.0 TO 17.0 FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT,	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGT TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED—UNDRAIN TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
1	9.4-		44.4	-	8.75" Concrete								
		5-			Stiff yellowish brown and gray LEAN CLAY (CL) w/sand, ferrous stains, and calcareous and ferrous nodules —stiff to very stiff 4'-6' —very stiff 6'-8'		71	112	19 18	43	16	27	40 40 a 0
- e₁ Ā	10.1	10-			clay 8'-10' Reddish brown and gray				20				<u> </u>
- 5	8.1			_	CLAYEY SILT (ML) —w/sand layer 10'—11' Medium stiff to stiff				19				
- 5	6.1	15-			reddish brown LEAN CLAY (CL) w/silt seams Hard reddish brown FAT CLAY		100	96	23 23	28 57	19 23	9 34	
- 5.	3.1				(CH) w/silt seams		100		24	37	23	54	40
		20-											
		30-											
C	Ā: I	TO FREE	WATE WAT PEN	ER	IN BORING: 1st ENCOUNTERED AT 11.0 FT. DURING DF 17.0 FT. AT END OF DRILLING. Ceotest Engine					IIM C	v. AT	8.	6 FT.

			LOG OF BORIN	G N	Ю.	GB-	-15							
PR(DJECT		COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3	llo A	rea		***************************************		PRO	JECT	Г NO. :	114	0194	4601
LOC	CATION	· ·	Houston, Texas N 13843355.78, E 3046709.27		0.4				COM	IPLE	TION DI	EPTH	: 1	4.0 FT.
SUF	RFACE	ELE	Carolcrest Dr.; See Plan of Borings (Fig VATION: 76.94 FT.			<i>)</i>	,		DATE	Ξ:	05-08-			
ELEVATION, FEET	ОЕРТН, FEET	SYMBOL		STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	O HAND	TS PENET INFINED INSOLID IAL COI	ROME COMI	TRENGTH, TER PRESSION UNDRAINE
			DESCRIPTION OF MATERIAL	STAND TEST,	Ⅱ	DR	NATE	2	J	BLAS	△ TORV. 0.5		.5 2	.0 2.5
76.9- 76.4-		0.0.0	_6" Concrete											
72.9-			Very stiff gray and brown LEAN CLAY (CL) w/ferrous stains, sand and ferrous nodules				16					of the section of the second o	Δ0	0
, 2,0	- 5-		Very stiff gray and reddish brown FAT CLAY (CH) w/calcareous and ferrous nodules				23					Δ	þ	
			-very stiff to hard 6'-8' -stiff to very stiff 8'-10' -w/silt seams 8'-15'				20					Δ		0
	- 10-	W	-very stiff to hard 10'-12'		92	104	26	50	21	29				
				WATER CONTRACTOR OF THE PROPERTY OF THE PROPER			23							0
62.9	- 15-	7					20							
	- 20-													

	- 25-													
	- 30-													
		THE PERSON NAMED AND ADDRESS OF THE PERSON NAMED AND ADDRESS O												
	- 35-													
DEPTI	H TO	WATER	R IN BORING :										·	
NO		JNDW	ATER ENCOUNTERED DURING DRILLING.			,								

	***************************************		LOG OF BORIN	G N	10.	GB-	-16				
PRO	DJECT	:	COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3						PRO	JECT	NO.: 1140194601
LOC	CATIO	V :	Houston Texas						СОМ	PLE	TION DEPTH : 14.0 FT.
SUF	RFACE	E ELI	N 13843362.63, E 3047243.59 Carolcrest Dr.; See Plan of Borings (Fi EVATION : 71.98 FT.	gure	2.1))					05-08-13
			SAMPLER : Shelby Tube/Split Spoon	T	T	T T	بپر			%	UNDRAINED SHEAR STRENGTH, TSF
FEET	FEET	7	2 DRY AUGER: 0.0 TO 14.0 FT.	VETRA PER	ASSIN	WEIGH	ISTUR	, %	AIT, %	INDEX,	O HAND PENETROMETER
ELEVATION,	ОЕРТН, F	SYMBOL	DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT.	D PE	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NTENT	LIQUID LIMIT,	PLASTIC LIMIT,	<u>-</u>	 UNCONFINED COMPRESSION UNCONSOLIDATED—UNDRAINED TRIAXIAL COMPRESSION
ELEV/	DEP		DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERC NO.	DRY	NATURAL MOISTURE CONTENT, %	LIQUI	PLASI	PLASTICITY	Δ TORVANE
- 72.0- - 71.3-	- 0-	0.0.0	_8.5" Cancrete	SE							0.5 1.0 1.5 2.0 2.5
,.			Medium stiff to stiff dark				20				
			gray LEAN CLAY (CL) w/sand, calcareous nodules								
			and ferrous stains —stiff 2'—6'				17				
	- 5-		-groy 4'-14'				20				40
			-stiff to very stiff 6'-8'								
			-stiff 8'-10'		73	111	20	46	20	26	
	- 10-						21				
			-very sandy clay 12'-14'				20				04 40
- 58.0-							19				
	- 15-										
	- 20-										
	- 25-										
	_ 25-										
	- 30-										
	- 35-			B7047071 1550 1550 1550 1550 1550 1550 1550							
			R IN BORING :	<u></u>	<u> </u>	L	1				
NO HO) GRO	DNDM DNDM				_					
			Geotest Engin	eer	ng,	Ir	c.	***************************************			

		LOG OF BORIN	G N	0.	GB-	-17		•••••		
PROJEC	1	COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3	lo A	rea				PRO	JEC1	NO.: 1140194601
LOCATIO SURFAC	I N : I E ELE	Houston, Texas N 13843243.50, E 3047920.79 Caralcrest Dr.; See Plan of Borings (Fi VATION : 72.50 FT.	gure	2.1))					TION DEPTH : 14.0 FT. 05-08-13
S ELEVATION, FEET DEPTH, FEET	SYMBOL SAMPI FS	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
- 72.5 - 0 72.0 10 58.5 - 15 20 30-		Stiff gray and brown LEAN CLAY (CL) w/ferrous stains, calcareous and ferrous nodules —stiff to very stiff 2'—4' —medium stiff to stiff 4'—6' —stiff to very stiff 6'—8' —gray and reddish brown 6'—14' —very stiff 8'—14' —w/silt seams 10'—12'		86	107	19 18 18 23 21 21 23	47	20	27	
- 35-	WATER	R IN BORING :								
HOLE O	PEN T	ATER ENCOUNTERED DURING DRILLING. O 14.0 FT. AT END OF DRILLING. Geotest Engin	eeri	ng,	In	ıc.				

ſ				LOG OF BOR	RING I	١٥.	GB-	-18		····				
	PRO	DJEC ⁻		COH Water Line Replacement in Kick WBS No. S-000035-0185-3	erillo /	\rea				PRO	JECT	NO. : 114	0194601	
	LOC	CATIO	N -	Houston, Texas N 13843321.25, E 3048601.27 Carolcrest Dr.; See Plan of Borings VATION: 69.37 FT.	(Figure	2.1)					TION DEPTH 05-08-13	: 17.0 F	- T.
ŀ	301	T ACI		SAMPLER: Shelby Tube/Split Spoon						DAIL		UNDRAINED SH	EAR STRENG	зтн,
	ELEVATION, FEET	ОЕРТН, FEET	SYMBOL		STANDARD PENETRATION	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %) LIMIT, %	IC LIMIT, %	PLASTICITY INDEX,	HAND PENE UNCONFINED UNCONSOLIE TRIAXIAL CO	TROMETER COMPRESSI	
				DESCRIPTION OF MATERIAL	STANDAR	PERC NO.	DRY	NATUR CO	LIQUID	PLASTIC	PLASTI	Δ TORVANE	.5 2.0 2.5	
F	69.4- 68.7-	- 0-	0.0.0	¬7.5" Concrete	\Box									
				Very stiff yellowish brown and gray LEAN CLAY (CL) w/sand, calcareous and ferrous nodules and ferrous stains				17 17				40		
호	:	- 5-		-gray silty sand 5.5'-6'	15			19				04		
~				-stiff to very stiff 8'-10'				23	-					
		- 10-		-stiff w/clayey sand layers		79	107	19	45	19	26			
	55.4-			12'-14' Medium dense reddish brown		en dermoderne en en debeken en en de		18				40		
	53.4- 52.4-	- 15-		SILT (ML) w/sand Very stiff to hard reddish	15	72		26 27	enterente de la companya de la compa					
	JZ.T			brown FAT CLAY (CH) w/silt seams and clay stone	$-\int$									
		- 20-												
						-	de de la companya del la companya de							
		- 25-												
						AND THE PROPERTY OF THE PROPER								
		- 30-												
					And a second									
		- 35-												
	₫.	FRFF	WATE	R IN BORING : R 1st ENCOUNTERED AT 14.0 FT. DURING O 17.0 FT. AT END OF DRILLING.					I	l. AT	7.0	D FT.		
-			***************************************	Geotest Eng	neer	ing	Ιγ	c.	-					

DRY AUGER: 0.0 TO 14.0 FT.		LOG OF BORING	G N	Ю.	GB-	-19				
LOCATON: N. 1364-313105 See Plan of Barings (Figure 2.1) SURFACE ELEVATION: 6.950-51. SURFACE ELEVATION: 6.950-51. DETHILO FOR AMERICAL STREAM SEED OF SEE PLAN OF BARINGS (Figure 2.1) DESCRIPTION OF MAIERAL DESCRIPTIO	PROJECT :	COH Woter Line Replacement in Kickeril WBS No. S-000035-0185-3	lo A	rea				PRO	JECT	NO.: 1140194601
SAMPLER : Shellby Tube/Spitt Spoon DRY AUGER : 0.0 TO 14.0 FT. Sample DRY AUGER : 0.0 TO 14.0 FT. DRY AUGER : 0.0	LOCATION :	Houston Texas						СОМ	PLE"	TION DEPTH : 14.0 FT.
DRY AUGER 0.0 TO 14.0 FT. Page 1.0	SURFACE ELI	Corolcrest Dr.; See Plan of Borings (Fig EVATION : 69.55 FT.	gure	2.1))			DATE	<u>:</u> : (05-08-13
5.25" Concrete Stiff to very stiff dork gray SANDY LEAN CLAY (CL) W/sond seams -very stiff gray and brown 2'-6' -stiff 6'-8' -w/colcoreous and ferrous nodules 6'-12' -yellowish brown and gray W/ferrous stains 6'-14' -very stiff 10'-14' -very stiff 10'-14' -25- -30- DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING.	1 1	DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	TANDARD PENETRATION EST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIMIT,		INDEX,	■ UNCONFINED COMPRESSION ■ UNCONSOLIDATED—UNDRAINED TRIAXIAL COMPRESSION △ TORVANE
gray SANDY LEAN CLAY (CL) W/sand seams -very stiff gray and brown 2'-6' -stiff 6'-8' -w/calcoreous and ferrous nodules 6'-12' -yellowish brown and gray w/ferrous stains 6'-14' -very stiff 10'-14' -very stiff 10'-14' -25- -20- DEPH TO WAIER IN BORING: MC GROUNDWAIER ENCOUNTERED DURING DRILLING.	- 69.6 - 0 A A A A	75.25" Concrete	SH							0.5 1.0 1.5 2.0 2.5
NO GROUNDWATER ENCOUNTERED DURING DRILLING.	- 10- - 10- - 15- - 20- - 25- - 30-	Stiff to very stiff dark gray SANDY LEAN CLAY (CL) w/sand seams -very stiff gray and brown 2'-6' -stiff 6'-8' -w/calcoreous and ferrous nodules 6'-12' -yellowish brown and gray w/ferrous stains 6'-14'		62	111	18 18 19 17	42	16	26	
Geotest Engineering, Inc.	NO GROUNDW	VATER ENCOUNTERED DURING DRILLING. TO 14.0 FT. AT END OF DRILLING.					1			

		***************************************	LOG OF BORIN	G N	10.	GB-	-20				
PRO	DJECT	: !	COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3						PRO	JECT	NO. : 1140194601
LOC	IOITA		Houston Texas						СОМ	PLE	TION DEPTH : 13.0 FT.
SUR	RFACE	ELE	N 13843051.86, E 3047189.44 Kellywood Lane; See Plan of Borings (I VATION : 71.31 FT.	igur	e 2.	1)			DATE	Ξ: (05-08-13
FEET	FEET	ار 1	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 13.0 FT.	ETRATION PER FOOT	ASSING SIEVE	/EIGHT,	STURE	к.	11, %	INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER
ELEVATION, FEET	ОЕРТН, FE	SYMBOL		STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT,	PLASTIC LIMIT,	PLASTICITY IN	UNCONFINED COMPRESSION UNCONSOLIDATED—UNDRAINED TRIAXIAL COMPRESSION
- 71.3-			DESCRIPTION OF MATERIAL	STAN(TEST,	퓝~	RO	NAT	ä	Ъ	P.	△ TORVANE 0.5 1.0 1.5 2.0 2.5
- 70.6-		D D D	_9" Concrete	-							
			Hard gray LEAN CLAY (CL) w/sand, calcareous and ferrous nodules and ferrous stains				14				40
- 65.3-	- 5-		-very stiff 4'-6'	4			16				40
- Proposition and the second			Stiff gray and brown FAT CLAY (CH) w/sand, ferrous nodules and ferrous stains		83	108	19	51	17	34	
- 61.3	- 10-		Medium stiff to stiff gray SANDY LEAN CLAY (CL)				20				
- 58.3			w/sand layers				18 19				ΔO
	- 15-										
	- 20-										
		THE PROPERTY OF THE PROPERTY O									
-	- 25-										
- -	70										
	- 30-										
-											
	- 35-	The second secon									
NO	GRO		R IN BORING: ATER ENCOUNTERED DURING DRILLING. O 13.0 FT. AT END OF DRILLING	eer	in a	Ιν).c				

			LOG OF BOR	۱G ۱	10.	GB-	-21				
PR(DJECT	1	COH Water Line Replacement in Kicke WBS No. S-000035-0185-3	rillo A	rea				PRO	JEC1	NO.: 1140194601
		:	Houston, Texas N 13842958.31, E 3047606.37 Kellywood Lone; See Plan of Borings VATION : 70.30 FT.	(Figur	e 2.	1)					TION DEPTH : 13.0 FT.
- -C. ELEVATION, FEET -C.	р рерти, геет	-	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 13.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT,	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER ■ UNCONFINED COMPRESSION ■ UNCONSOLIDATED—UNDRAINE TRIAXIAL COMPRESSION △ TORVANE 0.5 1.0 1.5 2.0 2.5
- 69.7-	0 6:		_6.75" Concrete Very stiff dark gray LEAN CLAY (CL) w/sand seams and ferrous nodules			Active or a recommendation of the first from the fi	16				40
- 64.3- - 60.3-	10		Stiff to very stiff yellowish brown and gray FAT CLAY (CH) w/sand, ferrous stains and ferrous nodules		76	108	17 21 20	52	21	31	ΔΦ
57.3			Medium stiff to stiff yellowish brown and gray SANDY LEAN CLAY (CL) w/sand seams, ferrous stains ond ferrous nodules				18 21				Δ Φ Δ Ο
	- 15-										
	- 25- - 30- - 35-										
NO	H TO W. O GROUN DLE OPE	1DM	R IN BORING: ATER ENCOUNTERED DURING DRILLING. D 13.0 FT. AT END OF DRILLING. Geotest Engin	0.000	in a	Ια					

				LOG OF BORIN	G N	10.	GB-	-22	(G	B-:	22P)	·
	PR()JEC1	:	COH Water Line Replacement in Kicker WBS No. S-000035-0185-3	llo A	rea				PRO	JEC	Г NO. : 11401	94601
	LOC	CATIO	N :	Houston, Texas N 13842946.14, E 3048243.63 Kellywood Lane; See Plan of Borings (EVATION: 68.27 FT.	Figur	e 2.	1)					TION DEPTH :	18.0 FT.
F	201	KFACE				,	T			DATI	Γ	05-06-13	STRENGTH.
	ELEVATION, FEET	ОЕРТН, FEET	SYMBOL	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 12.0 FT. WET ROTARY: 12.0 TO 18.0 FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	TSF O HAND PENETRO UNCONFINED C UNCONSOLIDATE TRIAXIAL COMPS	METER OMPRESSION
-	68.3-	- 0-	0.0.0 0.0		STAN	a		Ž		a.	4	0.5 1.0 1.5	2.0 2.5
ŀ	67.5-		11	_9" Concrete Stiff dark gray LEAN CLAY		į							
<u>~</u>		- 5-		(CL) w/sand -medium stiff to stiff 2'-6' -gray w/roots 2'-10'				19				40	
				-stiff to very stiff 6'-8'		80	111	17	30	15	15		
	58.3-	10		-medium stiff to stiff w/calcareous nodules 8'-10'				18 17					
立	36.3-	- 10-		Medium stiff to stiff reddish brown and gray LEAN CLAY (CL) w/silt seams		OPPOSITE OF THE PROPERTY OF TH		23				40	
	53.3-	- 15-		-w/silt stone 12'-12'3"		99	102	24	29	17	12		
	and the state of t			Very stiff to hard reddish brown FAT CLAY (CH) -hard 16'-17' -w/clay stone seams 16'-18'		100		25 26	59	23	36		0 0
	50.3	- 20- - 25-		NOTE : See Piezometer GB—22P for water level measurements.	The second state of the se								0
		- 30-	The state of the s										
		- 35-											
	ᇴ:	FREE	WATE	R IN BORING: ER 1st encountered at 12.0 ft. during di PTH at 4.7 ft., hole open to 18.0 ft. Geotest Engin	O NC	5-08	-13.		IIM C	N. AT	11.	7 FT.	

PROJECT : Col- Water Line Replacement in Kickerillo Area WSS No. \$0.00035-0135-3 LOCATION : \$1.364490.00035-0135-3 LOCATION : \$1.364490.367. \$2.048061.66 SURFACE ELEVATION of \$2.05. \$2.048061.66 SURFACE ELEVATION of \$2.05. \$2.05. \$3.0				LOG OF BORI	VG 1	10.	GB-	-23						
COMPLETION DEFIN: 13.0 FT. SURFACE ELEVATION: 79.60 FT. 13.0 FT. SURFACE ELEVATION: 79.60 FT. SURFACE ELEVATION: 7	PRO	OJEC	Γ:	WBS No. S-000035-0185-3	rillo A	rea				PRO	JEC1	Г NO. : 114	01946	501
SAMPLER : Shelty Tube/Spitt Spoon DRY AUGER 0.0 10 13.0 FT. WET ROTARY TO FT. DESCRIPTION OF MATERIAL State St	LOC	CATIO	N :	Houston, Texas N 13844596.67, E 3048061.66	/Eigur	^ ?	1 \			СОМ	PLE	TION DEPTH	: 13.	O FT.
58.1 Stiff to very stiff dark gray LEAN CLAY (CL) w/sand and ferrous stains -very stiff to hard gray and yellow w/calcareous nodules 4'-6' Very stiff reddish brown and gray FAT CLAY (CH) w/sand seams, calcareous nodules and ferrous stains - hard 10'-14' - 20 25 30 30-	SU	RFACE	ELE	EVATION: 79.60 FT.			' <i>)</i>			DATE	Ξ:	,		
Stiff to very stiff dork gray LEAN CLAY (CL) w/sand and ferrous stains -very stiff 2'-4' -very stiff 2'-4' -very stiff to hard gray and yellow w/calcareous nodules 4'-6' - 5' - 5' - 5' - 5' - 5' - 5' - 5'	ELEVATION,	оєртн,		DRY AUGER: 0.0 TO 13.0 FT. WET ROTARY: TO FT.	STANDARD PENETRATION	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIMIT,		INDEX,	HAND PENE UNCONFINED UNCONSOLID TRIAXIAL CO TORVANE	ROMETEI COMPR ATED-UI MPRESSI	R ESSION NDRAINEI ON
gray LEAN CLAY (CL) w/sond ond ferrous stains -very stiff 2"-4" -very stiff 2"-4" -very stiff 2"-4" -very stiff reddish brown and gray FAT CLAY (CH) w/sond seams, calcareous nodules and ferrous stains -hard 10"-14" 99 26 56 25 41	- 79.1-		0.0.0		\int									
Very stiff reddish brown and gray FAT CLAY (CH) w/sand seams, calcareous nodules and ferrous stains — hard 10'-14' 99	77.6	- 5-		gray LEAN CLAY (CL) w/sand and ferrous stains -very stiff 2'-4' -very stiff to hard gray and yellow w/calcareous				18						
99 26 66 25 41 OA OA - 15 20 30 35-	- 73.6-	- 10-		Very stiff reddish brown and gray FAT CLAY (CH) w/sand seams, calcareous nodules and ferrous stains		88	105		67	25	42			
- 20- - 25- - 30- - 35-	66.6-					99			66	25	41			_
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 13.0 FT. AT END OF DRILLING.	DEPT	- 20- - 25- - 30- - 35-	WATE	ATER ENCOUNTERED DURING DRILLING.										

		LOG OF BORING	G N	0.	GB-	-24						
PR		COH Water Line Replacement in Kickeril WBS No. \$-000035-0185-3	lo A	rea				PRO	JEC1	NO. : 11	4019	1601
LO SU	CATION :	Houston, Texas N 13844649.15, E 3048611.17 Clear Spring Drive; See Plon of Borings EVATION: 78.78 FT.	(Fi	gure	2.1)				TION DEPTH 05-06-13	ተ : 1 [,]	4.0 FT.
- 288 ELEVATION, FEET	DEP.	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED S HAND PEN UNCONFINI UNCONSOL TRIAXIAL C A TORVANE 0.5 1.0	ETROME ED COMI IDATED- OMPRES	TER PRESSION UNDRAINE SION
- 78.2		7.5" Concrete Very stiff gray and yellowish brown SANDY LEAN CLAY (CL) w/calcareous and ferrous nodules and ferrous stains -stiff 6'-8'		70	112	18 15	41	17	24		40	
- 70.8	- 10-	Very stiff gray and reddish brown FAT CLAY (CH) w/sand seams and calcareous nodules				17 23				40		
- 64.8	- 15-	-medium stiff to stiff, slickensided 10'-12' -hard 12'-14'		93	88	33 22	57	23	34		2	70
	- 20-											
	- 30-											
N	O GROUNDW	R IN BORING: CATER ENCOUNTERED DURING DRILLING. CO 14.0 FT. AT END OF DRILLING. CO Geotest Engine					ramero				***************************************	

PROJECT COM Water Line Replacement in Kickerfilo Area PROJECT NO. : 1140194601 Wash No. 5-000035-0158-3 Houston, Texas Surrace ELEVATION : 78.41 File						LOG OF BORIN	G N	10.	GB-	-25							
COMPLETION DEPTH : 14.0 FT SURFACE ELCVAION : N 1384452,69, E 3049019;26 Apple Free Road; See Plan of Borings (Figure 2.1) DATE : 05-06-13 DATE : 05-06-13		PRO	JEC ⁻	Γ:	W	/BS No. S-000035-0185-3	lo A	rea				PRO	JECT	「 NO. : 1	14019	4601	
Defend to Water in Doring South Act 15 South Act		LOC	ATIO	N :	N	L 13844522 69 F 3049019 26	/ e=+	,				COM	IPLE	TION DEP	ГН : '	14.0 F	Τ.
77.8 Very stiif dark gray LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains -hard 2'-4' -very stiff to hard gray and yellow 4'-6' 72.4 Very stiff gray and reddish brown FAT CLAY (CH) w/calcareous nodules, ferrous stains and sand seams -10 -hard 12'-14' 54.4 - 15- DEPTH 10 WALER IN BORING: NO GROUNDAMER IN COUNTERED DURING DRILLING, MOLE OPEN 10' 14.0 °FT, AT END OF DRILLING, MOLE OPEN 10' 14.0 °FT, AT END OF DRILLING, MOLE OPEN 10' 14.0 °FT, AT END OF DRILLING,		SUF	RFACE	E EL	A ۷ع.	pple Tree Road; See Plan of Borings /ATION : 78.41 FT.	(Figu	ire 2	2.1)			DATE	: :	05-06-1	3		
77.8 Very stiif dark gray LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains -hard 2'-4' -very stiff to hard gray and yellow 4'-6' 72.4 Very stiff gray and reddish brown FAT CLAY (CH) w/calcareous nodules, ferrous stains and sand seams -10 -hard 12'-14' 54.4 - 15- DEPTH 10 WALER IN BORING: NO GROUNDAMER IN COUNTERED DURING DRILLING, MOLE OPEN 10' 14.0 °FT, AT END OF DRILLING, MOLE OPEN 10' 14.0 °FT, AT END OF DRILLING, MOLE OPEN 10' 14.0 °FT, AT END OF DRILLING,		ATION, FEET	этн, ғеет	SYMBOL	SAMPLES	DRY AUGER: 0.0 TO 14.0 FT.	RD PENETRATION ILOWS PER FOOT	CENT PASSING 200 SIEVE	UNIT WEIGHT, PCF	AAL MOISTURE ONTENT, %	LIMIT,	LIMIT,	INDEX,	O HAND PE	TSF ENETROM NED CO	ETER MPRESSIC	N
Very stiff dark gray LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains -hard 2'-4' -very stiff to hard gray and yellow 4'-6' Very stiff gray and reddish brown FAT CLAY (CH) w/colcareaus nodules, ferrous stains and sand seams -10 -hard 12'-14' 54.4 -15 DEPTH TO WAITR IN BORING: NO GROUNDWAITER ENCOUNTERED DURING DRILLING. HOLD OPEN TO 14.0 FT, AIF END OF DRILLING.						DESCRIPTION OF MATERIAL	STANDA TEST, B	PERC	DRY	NATUF	LIQU	PLAS	PLAST	△ TORVANE			
CLAY (CL) w/sand, ferrous nodules and ferrous stains -hard 2'-4' -very stiff to hard gray and yellow 4'-6' Very stiff gray and reddish brown FAT CLAY (CH) w/calcareaus nodules, ferrous stains and sand seams -hard 12'-14' -hard 12'-14' 96 29 69 26 43 DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTEED DURING DRILLING. HOLE OPEN TO '14.0 FT. AT END OF DRILLING.	F	77.8	- 0-	0.4.4		√7" Concrete											
Very stiff gray and reddish brown FAT CLAY (CH) w/calcareous nodules, ferrous stains and sand seams -10 -hard 12'-14' 96 29 69 26 43 -20 -2535- DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.						CLAY (CL) w/sand, ferrous nodules and ferrous stains —hard 2'—4' —very stiff to hard gray and								•		40	
Very stiff gray and reddish brown FAT CLAY (CH) w/calcareous nodules, ferrous stains and sand seams - 10 hard 12'-14' - 20 25 30 30 NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 11-0. FT. AT END OF DRILLING.		72.4	- 5-	7),		yellow 4'-6'				15					C	<u> </u>	
- 10-						brown FAT CLAY (CH) w/calcareous nodules, ferrous stains and sand		86	105	21	65	25	40				
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.			- 10-			seams				22				h			
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.						-hord 12'-14'		96		29	69	26	43		0		
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.	F	64.4-								21						40	
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.			- 15-														
DEPTH TO WAITER IN BORING : NO GROUNDWAITER ENCOUNTERED DURING DRILLING, HOLE OPEN TO 14.0 FT. AT END OF DRILLING,																	
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING, HOLE OPEN TO 14.0 FT, AT END OF DRILLING,																	
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.			- 20-														
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.																	
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.																	
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.			- 25-														
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.																	
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.		-															
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.		-	- 30-														*******
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.																	
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.																	
NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 14.0 FT. AT END OF DRILLING.			- 35-														
Geotest Engineering, Inc.		NO	GRO	יםאטי	WA	TER ENCOUNTERED DURING DRILLING.) 14.0 FT. AT END OF DRILLING.			_								

	LOG OF BORIN	G N	Ο.	GB-	-26				
WBS No. S-0000	Replacement in Kickeri 135—0185—3	llo Ar	rea				PRO	JEC1	NO.: 1140194601
Houston, Texas LOCATION: N 13841898.46,	E 3048966.06	- (E:	21150	2 2	١		СОМ	IPLE	TION DEPTH : 13.0 FT.
Hickory Post Lon SURFACE ELEVATION : 69.29	FT.		,	۷۰۷,	,		DATE	:	05-08-13
SAMBOL SAMBLES SAMBOL SAMBLES DESCRIPTION OF SAMBLES SAMBLES DESCRIPTION OF SAMBLES DESCRIP	ON OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION TRIAXIAL COMPRESSION TORVANE 0.5 1.0 1.5 2.0 2.5
6.75" Concret		-							
Very stiff to LEAN CLAY (ferrous nodule ferrous stain - hard 2'-4' - very stiff 4' - very stiff 4' - very stiff 4' - 20 25-	hard gray CL) w/sand, iles and s -13'		80	115	14 16 16 16 17	45	19	26	
- 30- - 35-									
DEPTH TO WATER IN BORING : NO GROUNDWATER ENCOUNTERED HOLE OPEN TO 13.0 FT. AT EN	DURING DRILLING. D OF DRILLING. — Geotest Engin	eeri	ng,	In	ıc.				

					LOG OF BORIN	G N	10.	GB-								• • • • • • • • • • • • • • • • • • • •	***********
	PRO	DJECT	:	C	OH Water Line Replacement in Kickeri /BS No. S-000035-0185-3	lo A	rea		***************************************	*********	PRO	JECT	NO.	: 1 14	10194	1601	
	LOC	OITA	N :	H	ouston, Texas 1.3842412 61, F. 3048975 57						COM	IPLE"	TION I	DEPTH	: 1.	3.0	FT.
	SUF	RFACE	ELI	H EV	ickory Post Lane; See Plan af Borings ATION : 70.56 FT.	; (Fi	gure	2.2	()				05-0				
					SAMPLER : Shelby Tube/Split Spoon	NO NO NO	U	<u> </u>	Ш			2%	UNDRA	INED SI	HEAR S	TREN	GTH,
	FEET	FEET	7.	ES	DRY AUGER: 0.0 TO 13.0 FT.	VETRA PER 1	ASSIN	WEIGH	ISTUR	7,	LIMIT, %	VDEX,	О на	ND PENE	TROMET	TER	
	ELEVATION, FEET	ОЕРТН, Я	SYMBOL	SAMPLES	WET ROTARY: TO FT.	D PE	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT,	NTENT	LIQUID LIMIT,	NI DI	II YIII	_	CONFINEI CONSOLII AXIAL CO			
	ELEV	DEP			DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERC NO.	DRY I	NATURAL MOISTURE CONTENT, %	LIQUIE	PLASTIC	PLASTICITY INDEX,	_ 1AI. △ TOF		IMPKES	ZION	
L	70.6- 70.1-	- 0-	0.0.0		36" Concrete r	ST		-	~			ш.	0.5	1.0	1.5 2.	0 2.	5
	, 0. ,				Stiff to very stiff gray				19					ΔΦ			
					LEAN CLAÝ (CL) w/ferrous nodules and ferrous stains								'	30			
	access of the second				-very stiff to hard 2'-6' -yellowish brown and groy				14						4	þ	
		- 5-			4'-13'				16						Δ		-
																٧	
İ					-stiff 8'-10'				19					Δφ			
							88	106	21	49	21	28		A #88			
		- 10-			-very stiff 10'-12'			100	21	73	Σ,	20					
					-stiff 12'-13'				18					40			
-	57.6		777						20					40			
		- 15-															
		- 20-		-											-		ļ

		- 25-															-
	-																
		- 30-															
			the state of the s														
	ŀ	7.5															
		- 35-													-4		
	DEPTH NO	H TO GRO	WATE WDNU	R VAT	IN BORING : TER ENCOUNTERED DURING DRILLING.								***************************************		-		
<u></u>	НО	LE OF	PEN	ΤÒ	13.0 FT. AT END OF DRILLING. Geotest Engine	oor	ina	J~	2.0								
					George Engine	3 6 1	uug,	17	ou.								

			LOG OF BORIN			GB-	-28				
PRO	DJECT	V	COH Water Line Replacement in Kickeri WBS No. <u>S</u> -000035-0185-3	llo A	rea				PRO	JECT	NO.: 1140194601
LOC	CATION		Houston, Texas N 13844373.27, E 3050343.63 Apple Tree Lane; See Plan of Borings VATION : 71.66 FT.	(Figu	re 2	.3)					TION DEPTH : 14.0 F
501	TRACE	ELE		7					DATE	. : '	05-07-13 UNDRAINED SHEAR STRENGT
ELEVATION, FEET	ОЕРТН, FEET	SYMBOL SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT.	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	INDEX,	TSF O HAND PENETROMETER UNCONFINED COMPRESSIO UNCONSOLIDATED - UNDRAI TRIAXIAL COMPRESSION
			DESCRIPTION OF MATERIAL	STANDAR TEST, BI	PERC NO.	DRY	NATUR. CO	LIQUI	PLAS	PLASTICITY	△ TORVANE 0.5 1.0 1.5 2.0 2.5
71.7- 71.2-		77	√6" Asphalt								
			Stiff to very stiff gray LEAN CLAY (CL) w/sand				13				
	- 5-		-very stiff 4'-8' -w/calcoreous and ferrous nodules 4'-14'				18				(A)
			nodules 4 – 14				16				
			—gray and yellowish brown 8'—14'		7.0	110	16	40	20	20	
	- 10-		-w/roots 10'-14'		/0	110	19	49	20	29	
57.7-							18				
37.7	- 15-										
	- 20-										
	- 25-										
- Inches	- 30-										
	- 35-										

	LOG OF BORING	G N	0.	GB-	-29				
WBS	Water Line Replacement in Kickerill No. S-000035-0185-3	lo Ai	rea				PRO	JECT	NO.: 1140194601
LOCATION: N 13	ston, Texas 3843979.32, E 3050478.92 Bird Lane; See Plan of Borings (F	igure	e 2.3	3)					TION DEPTH : 20.0 FT.
SURFACE ELEVATION	ON : 70.94 FT.	25					DATE		05-07-13 UNDRAINED SHEAR STRENGTH,
, FEET FEET 30L 71ES 71	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 20.0 FT. WET ROTARY: TO FT.	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	Y UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION
- 70.9 · O	DESCRIPTION OF MATERIAL	STAND TEST,	g.	DRY	NAT	LIC	PL	PLA	△ TORVANE 0.5 1.0 1.5 2.0 2.5
15	5.5" Asphalt								
Sti Sti	iff to very stiff gray SANDY LEAN CLAY (CL) v/sand seams very stiff 2'-6'				17				
-v	gray w/calcareous nodules 4'-10' w/ferrous nodules and ferrous stains 6'-20'		66	116	16	4.0	20	26	ΔΟ
	very stiff 8'-14' gray and yellow 8'-20'		66	116	18	46	20	26	
					16				
- 15-	stiff 14'-16'				17				Δ Φ
-s	stiff to very stiff 16'-20'		68	116	16	35	16	19	
- 50.9 20	v/calcareous nodules 18.5'-20'				17				Δ Φ
- 25-						THE PROPERTY OF THE PROPERTY O			
- 30-		and the second s							
- 35-									
DEPTH TO WATER IN I NO GROUNDWATER HOLE OPEN TO 20	BORING: ENCOUNTERED DURING DRILLING. O.O FT. AT END OF DRILLING. Geotest Engine	eri	ng,	In	.c.				

			LOG (OF BORING	3 N	0.	GB-	-30							
PI	ROJEC	T :	COH Water Line Replacement WBS No. S-000035-0185-3	t in Kickerill	0 A	ea				PRO	JECT	NO. :	1140	0194	601
LC	OCATIO	N :	Houston, Texas	61		0 7				COM	IPLE	TION DE	PTH	: 15	5.0 FT
SI	JRFAC	E EL	Cardinal Lane; See Plan of EVATION: 70.74 FT.	Borings (Fig		2.3)		,		DATE	<u>:</u> :	05-07-	13		MITTER BERT STREET
ELEVATION, FEET	ОЕРТН, FEET	SYMBOL		it Spoon 5.0 FT. FT.	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	ICITY INDEX, %	O HAND O UNCOR UNCOR TRIAXI	TS PENETI NFINED	F ROMET COMF	ER PRESSION
- 70.7			DESCRIPTION OF MATER	MAL	STANDAR TEST, BI	PERC NO.	DRY	NATUR. CO	LIQUI	PLAS.	PLASTICITY	△ TORVA	NE		0 2.5
- 69.8	3-	77													
			Hard gray LEAN CLAY (C w/sand and ferrous no	CL) odules				15							
	- 5-			The state of the s				14							
			-w/sand seams 6'-15'	A special section of the section of				15 16							70
	- 10-		-gray and yellowish bro w/calcareous nodules 8'-15'	wn				17							0/20
			-very stiff 10'-11' -stiff 11'-13'					18					40		
			-very stiff 13'-15'			75	109	18	43	19	24				
- 55.7	15-							17					40		
	- 20-														
	- 25-														
				and the second second											THE RESIDENCE OF THE PERSON NAMED IN
	30-														
	- 35-														
١ ١	NO GRO	עמאוונ	ER IN BORING : VATER ENCOUNTERED DURING DRIL TO 15.0 FT. AT END OF DRILLIN	LING. G.					1			41.4			
	***************************************	***************************************	Geotes	t Engine	eri	ng,	Ir	c.							***************************************

			LOG OF BORIN	G N	0.	GB-	-31				
PRO	OJECT :	٧	COH Water Line Replacement in Kickeri VBS No. S-000035-0185-3	llo A	reo				PRO	JEC1	NO.: 1140194601
LOC	CATION :		Houston, Texas N 13843196.35, E 3050374.35	/ ·	,	\			СОМ	PLE.	TION DEPTH : 15.0 FT.
SUF	RFACE EL	ر E\	N 13843196.35, E 3050374.35 Cindywood Circle; See Plan of Borings VATION : 67.14 FT.	7	ire 2	2.2)		,	DATE	: :	05-07-13
S ELEVATION, FEET	DEPTH, FEET SYMBOL	SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
- 67.1- - 66.6-	0 0 0 0	3	√6" Concrete								
- 63.1-			Very stiff gray LEAN CLAY (CL) w/sand, ferrous stains and ferrous nodules -w/oyster shell 6"-7.5"	Lancescale	82		16 17	48	19	29	
	- 5- 		Very stiff gray SANDY LEAN CLAY (CL) w/sand seams and ferrous nodules —stiff to very stiff 6'—10'				16	:			A 0
	- 10-		-w/roots 8'-14' -medium stiff to stiff 10'-12'				16				
			-stiff 12'-14' -stiff to very stiff 13'-15'		66	111	18 18	30	16	14	
- 52.1-	- 20- - 25- - 30- - 35-	L	IN BORING .				10				
NO		WA	IN BORING: TER ENCOUNTERED DURING DRILLING. 15.0 FT. AT END OF DRILLING	eeri	ng.	Ιγ	ıc.				T-1-70 (MINES TO MINES

				LOG OF BORIN			GB-	-32				
PRO	DJECT	Γ:	W	OH Water Line Replacement in Kickeril BS No. S-000035-0185-3	lo A	rea				PRO	JEC1	NO.: 1140194601
LOC	CATIO	N:	- N	ouston, Texas 13842785.19, E 3050359.24 oralcrest Drive; See Plan of Borings (ATION : 67.94 FT.	Figur	e 2	.2)					TION DEPTH : 18.0 FT. 05-06-13
92.6 ELEVATION, FEET	ОЕРТН, FEET	SYMBOL	SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 18.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED - UNDRAIN TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
67.4-	- 5-			Very stiff gray and yellowish brown LEAN CLAY (CL) w/sand and ferrous stains -w/sand seams 1'-10' -w/calcareous nodules 3'5"-6' -w/ferrous stains 4'-10' -stiff to very stiff 6'-8' -gray 6'-10' -medium stiff to very stiff 8'-10'		82	117	19 14 14	34	17	17	Δ O Δ O Δ O Δ O Δ O Δ O Δ O Δ O Δ O Δ O
57.9-	- 15- - 20- - 25- - 30-			Medium dense gray SANDY SILT (ML) w/lean clay seams Very stiff gray and yellowish brown LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains —stiff to very stiff 14'—16' —very stiff to hard 16'—18'	16	50	117	11	41	16	25	
NO		UNDI	WA	IN BORING: IER ENCOUNTERED DURING DRILLING. 18.0 FT. AT END OF DRILLING. ————————————————————————————————————	o o m	'na	Ix					

SAMPLER 10,000 14.0 Ft.			LOG OF BORING	3 N	0.	GB-	-33				
COMPLETION DEPTH: 14.0 FT. COMPLETION DE	PR		WBS No. S-000035-0185-3	lo A	rea				PRO	JEC1	Г NO. : 1140194601
Very stiff gray ond yellow FAT CLAY (CH) w/ferrous 15	LOC SUF	CATION .	N 13842469 02 F 3050530 51	igur	e 2.2	2)					
Very stiff gray ond yellow FAT CLAY (CH) w/ferrous 15		DEP	DRY AUGER: 0.0 TO 14.0 FT. WET ROTARY: TO FT.	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %			INDEX,	O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION A TORVANE
FAT CLAY (CH) w/ferrous stoins nodules and ferrous stoins -w/calcareous nadules 2'-4' Stiff to very stiff groy SANDY LEAN CLAY (CL) w/sond seams, ferrous nodules and ferrous stoins -stiff 10'-12' -medium stiff to stiff 17' -stiff 12'-14' DEPTH TO WATER IN BORING:	- 68.8- - 68.3-	0 0.0.0	√6" Concrete	07;							0.5 7.5 7.5 2.5 2.5
DEPTH TO WATER IN BORING :	- 64.8-	- 10- - 10- - 15- - 20- - 25-	Very stiff gray and yellow FAT CLAY (CH) w/ferrous nodules and ferrous stains —w/calcareous nodules 2'-4' Stiff to very stiff gray SANDY LEAN CLAY (CL) w/sand seams, ferrous nodules and ferrous stains —stiff 10'-12' —medium stiff to stiff		66	116	18 19 18 14	31	15	16	ΔO Δ
HOLE OPEN TO 14.0 FT. AT END OF DRILLING,	NC) GROUNDW	ATER ENCOUNTERED DURING DRILLING.								

		LOG OF BORING	3 N	0.	GB-	-34				
PROJECT	V	COH Water Line Replacement in Kickeril WBS No. S-000035-0185-3	lo A	rea				PRO	JEC1	NO. : 1140194601
LOCATION		Houston, Texas N 13841932.22, E 3050082.07 River Forest Drive: See Plan of Borings	(Fic	nure	2 2)	١		СОМ	PLE	TION DEPTH : 15.0 FT.
SURFACE	ELE'	R 13041932.22, E 3030082.07 River Forest Drive; See Plan of Borings VATION : 68.39 FT.		,	2.2)	' 		DATE	:	05-06-13
ELEW	SYMBOL SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION INCONSOLIDATED - UNDRAINE TRIAXIAL COMPRESSION A TORVANE
68.4 0 67.9 67.9	.9:0	√6" Concrete	SH							0.5 1.0 1.5 2.0 2.5
53.4-15-		Very stiff to hard gray LEAN CLAY (CL) w/sand, ferrous nodules and ferrous stains -w/roots 6"-2' -hard 2'-8' -gray and brown 2'-15' -w/calcareous nodules 4'-12' -stiff to very stiff 10'-12' -stiff 12'-13' -medium stiff to stiff 13'-15'		71	117	12 11 12 14 16 17 19	42	18	24	
DEPTH TO V NO GROU HOLE OPI	WATER INDWA	R IN BORING: STER ENCOUNTERED DURING DRILLING. D 15.0 FT. AT END OF DRILLING. ————————————————————————————————————								

					LOG OF BORIN	G N	10.	GB-	-35				*************					
	PRC	JECT	· ;	W	OH Water Line Replacement in Kickeri /BS No. S-000035-0185-3	llo A	rea				PRO	JECT	NO	. :	1140	0194	601	
	LOC	IOITA	N :	- ∟	louston, Texas 13842119.32, E 3050487.34 liver Forest Drive; See Plan of Borings ATION	/					COM	IPLE	ΓΙΟΝ	DEP	тн	: 15	5.0	FT.
	SUR	FACE	E El	EV	iver Forest Drive; See Plan of Borings ATION : 68.74 FT.	(Fig	gure	2.2)		DAT	Ξ:	05-0	06-1	3	described to the described		
	ELEVATION, FEET	ОЕРТН, FEET	SYMBOL	SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	JOUID LIMIT, %	PLASTIC LIMIT, %	LASTICITY INDEX, %	O H	RAINED AND P NCONF NCONS RIAXIAL DRVANI	ENETI INED SOLIDA COM	ROMET COMF	ER PRESS	iON
-	68.7	- 0-	0.0.0	3	0.5% 0	STA		ļ	Ž			配	0.5	5 1.0) 1.	5 2.	0 2.	5
	67.9-	E			6.5" Concrete over 3" Sand Hard gray and yellowish brawn LEAN CLAY (CL) w/sand and ferraus stains -w/roots 9.5"-1'				16								Ø Ø	
		5			-w/calcareous nodules 6'-8' -very stiff to hard 6'-10' -gray 6'-12' -w/ferrous nodules 8'-12'		de santagraphisme volcher, des mandrais estades la santagraphisme de des de de la mandrais de la mandrais de l		15							Δ	0	
-	56.7	- 10-			-very stiff 10'-12'	-	78	117	13	31	16	15				0	0	
-	55.2-			X	Medium dense gray SANDY SILT (ML) _Stiff to very stiff gray	14	56		13									
		- 20- - 25- - 30- - 35-	WAT		and brown SANDY LÉAN CLAY (CL) w/ferrous stains and ferrous nodules IN BORING :				19									
	NO	GRO	UND	WΑ	IN BORING: TER ENCOUNTERED DURING DRILLING. 15.0 FT. AT END OF DRILLING. ————————————————————————————————————	eeri	ing,	Ιγ	ıc.									

			LOG OF	BORIN	G N	10.	GB-	-36	(G	В	36P)				
	PROJECT :	COH Water Line Rep WBS No. S-000035	placement in -0185-3	Kickeri	llo A	rea				PRO	JECT	NO.	. : 11	4019	4601	
	LOCATION :	Houston, Texas N 13841495.30, E	3050236.19	Posis = -	/c:-		2 21			COM	PLE	TION	DEPT	⊢ : 1	4.0	FT.
	SURFACE EL	Heatherfield Drive; S EVATION : 67.50 FT.	see Flan of	borings	· ·	,	۷.۷)	·		DATE	Ξ: (06-13			
	ET	SAMPLER : Shelby			STANDARD PENETRATION TEST, BLOWS PER FOOT	SING	GHT,	URE	88	%	χ, %	_	RAINED S	TSF		GTH,
	ATION, FE TH, FEET SYMBOL	7	0.0 TO 14.0 TO	FT.	PENET VS PE	T PAS 30 SIE	UNIT WEIGHT, PCF	MOIST ENT, %	JIMIT,	LIMIT,	Y INDEX,	U1	NCONFIN	ED COM	IPRESS	
	DEPTH, FEET	DESCRIPTION	OF MATERIAL		DARD BLO	PERCENT PASSING NO. 200 SIEVE	DRY UN	NATURAL MOISTURE CONTENT, %	LIQUID	PLASTIC	PLASTICITY		NCONSOL RIAXIAL (DRVANE	OMPRE	-UNDR SSION	AINEC
-	67.5		·		STAN	Δ.	Ω	Ϋ́		д.	. J.		5 1.0	1.5 2	2.0 2.	.5
	67.0-	5.5" Concrete o Oyster Shell	ver i					9								
		Hard gray LEAN w/silt seams of stains	CLAY (CL) and ferrous		Account and property of the pr	91		9	31	15	16				0	
ŀ	63.5	-very stiff to h						9							0	
		Hard gray LEAN w/sand and fe gray and brow	rrous stains	S				12								
		-very stiff to h				81	121	11	35	17	18		and the state of t		0	•
	- 10-	-w/silt seams	10'-12'					10						+	0	
								13						Δ	0	
ŀ	53.5							16						Δ	0	
	- 15-	NOTE : See Piezomet	er GB-36P	for	-											
		water level m			-											
					A. T. C.											
	- 20-															
	- 25-															

	- 30-													-		
	- 35-															
\vdash	DEPTH TO WAT	ER IN BORING :	101110 20	^	<u></u>											
	NO GROUND NO GROUND	WATER ENCOUNTERED DI WATER ENCOUNTERED, H	JRING DRILLING OLE OPEN TO Geotest 1	14.0 F												
			GEOLEST I	sugrn	ee7"	uug,	17	w.								

Γ	••••••••••			•	LOG OF BORIN	G N	10.	GB-	-37							*****		
	PRO	DJEC ⁻	Γ;	— С И	OH Water Line Replacement in Kicker /BS No. S-000035-0185-3				·		PRO	JECT	ΓΝΟ). :	1140)194	601	
	LOC	CATIO	N :	Н	louston Texas						COM	IPLE	TION	DEF	PTH	: 14	.0	FT.
	SUF	RFACI	E EL	EV.	l 13841794.36, E 3050560.07 leatherfield Drive; See Plan of Borings /ATION : 68.24 FT.	(Fig	jure	2.2)			DAT	Ε:	05-	06-	13			
	_				SAMPLER : Shelby Tube/Split Spoon	FOOT	9	ļ,	W.		%	88	UND	RAINE	D SHE	AR S	TREN	GTH,
	, FEET	133-	301	LES	DRY AUGER : 0.0 TO 14.0 FT.	NETR/ PER	PASSII	WEIGH	DISTUR	Ĭ, %	LIMIT, %	INDEX	1		PENETF FINED			ION
	ELEVATION,	ОЕРТН, FEET	SYMBOL	SAMPLES	WET ROTARY : TO FT.	RD PE	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	גומטום גואוד,	PLASTIC L	LASTICITY INDEX,	1		SOLIDA L COM			
					DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PER	DRY	NATUR	LIQU	PLAS	PLAST	Δт	ORVAN				
-	68.2 67.4	- 0-	000		6.5" Concrete over 3" Oyster Shell	- 0712											, ,	
					Medium stiff to stiff gray				22				Δ	þ				
					LEAN CLAY (CH) w/sand seams and ferrous stains				20)	
		- 5-			-very stiff to hard 2'-6'		0.5		4.0									
F	62.2				Stiff to hard gray and	1	95		18	44	20	24			4	7	0	
					yellowish brown LEAN CLAY (CL) w/sand, ferrous				16					Δ			0	
		- 10-			nodules and ferrous stains -stiff to very stiff 8'-10' -very stiff to hard 10'-14'		72	117	15	34	16	18		/10				
					-very still to fluid 10-14													
									14							¢)	
-	54.2								15						Δ	¢)	
		- 15-																
		- 20-				-												
		- 25-					-									_		
	-	- 30-																
		- 35-												L	L		1	
	NO	GRO	UND	MAT	IN BORING : FER ENCOUNTERED DURING DRILLING.				L									
-	НО	LE O	PEN	TO	14.0 FT. AT END OF DRILLING. Geotest Engin	eer	ina.	ΙΥ	ic.				************				·	
					2 2 2 0 2 0 2 1 0 g 0 1 C	,	., 09,	4 /										

	LOG OF BORING	G N	0.	GB-	-38					
1	COH Water Line Replacement in Kickeril WBS No. S-000035-0185-3	la A	rea			Hentstert Inner	PRO	JEC1	NO.: 1140194601	
I OCATION :	Houston, Texas N 13841480.11, E 3049425.92 Rancho Bauer Dr.; See Plan of Borings VATION : 70.91 FT.	(Fiç	gure	2.2)	l				TION DEPTH : 15.0 F	Т.
OEPTH, FEET SAMBIES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTSF O HAND PENETROMETER UNCONSOLIDATED—UNDRAITRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5	ON INE
70.9 0	12" Asphalt									
	Very stiff gray and reddish brown LEAN CLAY (CL) w/ferrous nodules and ferrous stains —stiff 2'—6' -very stiff to hard 10'—12' -w/sand pockets 14'—15'		88	1114	19 25 22 17 16 16 14	47	18.	29		
DEPTH TO WATER NO GROUNDWA HOLE OPEN TO	ATER ENCOUNTERED DURING DRILLING.									

	LOG OF BORIN	G N	0.	GB-	-39				
	COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3	llo Ai	rea				PRO	JEC1	NO.: 1140194601
LOCATION .	Houston, Texas N 13841997 23 F 3049446 47				۵,		СОМ	IPLE	TION DEPTH : 15.0 FT.
SURFACE ELE	Rancho Bauer Drive; See Plan of Borin EVATION : 71.64 FT.		- igur	e 2.	۷)		DATE	<u>:</u> :	05-08-13
DEPTH, FEET	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
- 70.6 - 5-	12" Asphalt Stiff dark gray LEAN CLAY (CL) w/ferrous nodules and ferrous stains -very stiff 2'-4' -w/vertical sand seams 2'-6' -very stiff to hard 4'-6' -very stiff 6'-8'				17 16				
- 63.6	Very stiff to hard yellowish brown and gray FAT CLAY (CH) w/sand seams and ferrous nodules				16 16				
- 56.6- 15-	-very stiff 10'-14' -stiff to very stiff 14'-15'		88	108	17 16 18	51	21	30	
- 20- - 25- - 30- - 35- DEPTH TO WATE	R IN BORING :								
NO GROUNDW HOLE OPEN T	ATER ENCOUNTERED DURING DRILLING.	eeri	ng,	In	ıc.				

LOG OF BORIN	IG N	10.	GB-	-40				
PROJECT : COH Water Line Replacement in Kicker WBS No. S-000035-0185-3	llo A	rea		•		PRO	JECT	NO.: 1140194601
Houston, Texas LOCATION: N 13842530.31. E 3049419.47	,	_,	0	۵\		СОМ	PLE	TION DEPTH : 15.0 FT.
Rancho Bauer Drive; See Plan of Borin SURFACE ELEVATION : 70.91 FT.	igs (Figur	e 2.	2)		DATE	: (05-08-13
SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	UNIT WEIGHT,	NATURAL MOISTURE CONTENT, %	LIMIT, %	LIMIT, %	M INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION
	STANDARD FEST, BLO	PERCEN NO. 2	DRY UN	NATURAL CON	LIQUID LIMIT,	PLASTIC	PLASTICITY	■ UNCONSOLIDATED—UNDRAINED TRIAXIAL COMPRESSION △ TORVANE 0.5 1.0 1.5 2.0 2.5
70.9 0 12" Asphalt	10,1							
Very stiff brown and gray LEAN CLAY (CL) w/sand, ferrous stains and ferrous nodules	***************************************			28 17				
-very stiff to hard 2'-8' -yellow and gray w/vertical sand seams 4'-6'				15				Φ Φ
	A PROPERTY AND A PARTY AND A P	81	112	15 17	42	17	25	
- 10- 				15				ΔΦ
-medium stiff to stiff very sandy clay 14'-15'				20 18				QA 0
		P P P P P P P P P P P P P P P P P P P						
- 20-	TO THE PROPERTY OF THE PROPERT	PARTIN PROGRAMMA DI GRANDANA DI GRANDANA DA TRANSPORTANA DI GRANDANA DI GRANDA						
- 25-	standiningan secretary version secretarion					На виде структива избала применения		
- 30-								
- 35-								
DEDITI TO WATER IN SOCIO								
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 15.0 FT. AT END OF DRILLING. Geotest Engin	eeri	ing,	Ir	ıc.	***************************************	···		

				LOG OF BORIN	G N	10.	GB-	-41	··········							
F	PROJE	CT :	V	COH Water Line Replacement in Kickeri VBS No. S-000035-0185-3	llo A	rea				PRO	JEC1	NO. :	1140	194	601	-
L	.OCATI	: NC	- 1	Houston, Texas N 13842978.92, E 3049396.04	,	C •		۵)		COM	PLE	TION DEF	PTH :	: 20	.O f	FT.
S	URFA	CE E	۲ LE۱	Rancho Bauer Órive; See Plan of Borin /ATION : 71.74 FT.	gs (rigur	'e 2.	.2)		DAT	:	05-08-	13			
E		and		SAMPLER : Shelby Tube/Split Spoon	RATION FOO	PERCENT PASSING NO. 200 SIEVE	SHT,	URE	8%	%	×, %	UNDRAINE				STH,
N, FE	FEET	SYMBOL	SAMPLES	DRY AUGER : 0.0 TO 20.0 FT. WET ROTARY : TO FT.	PENET /S PE	T PAS	UNIT WEIGHT,	MOIST ENT, %	LIMIT,	LIMIT,	Y INDEX,	UNCON	FINED	СОМР	RESSI	
ELEVATION, FEET	DEPTH,	S.	SA		DARD BLOW	RCEN 10. 20	DRY UNI	NATURAL MOISTURE CONTENT, %	רוסחום ד	PLASTIC	PLASTICITY	UNCON TRIAXIA		TED-L PRESS	JNDRA SION	NED
1		0		DESCRIPTION OF MATERIAL	STAN TEST,	d. 2-	jū	NAT	5	P	2	△ TORVAN 0.5 1.		5 2.0	0 2.	5
- 70.	-	——————————————————————————————————————		14" Asphalt												1
				Very stiff dark gray LEAN CLAY (CL) w/sand, ferrous	-			14					7 (ı
				stains and ferrous nodules —hard 2'—6'	-	***************************************		14						4	0	1
	-	5-			- The second sec			14								
- 65.	.7	1		Very stiff to hard gray and brawn FAT CLAY (CH) w/sand				, 7								
				seams, ferrous stains ond ferrous nadules				16						Δ		
	11			-very stiff 8'-10' -stiff to very stiff 10'-20'		87	113	16	59	23	36					L
	-			atili to very atili 10 20												
								20					4			
								21				2				
	- 1	5/				85	109	20	59	23	36					
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- 51	.7- 2	7						23								
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		1														ı
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	- 30															
		-														
		1														
	- 35	j-														
				IN BORING :	<u> </u>	<u> </u>										
	NO GF HOLE	OUNE OPEN	TC	TER ENCOUNTERED DURING DRILLING. 20.0 FT. AT END OF DRILLING.		•										
			-		eer	ng,	$I\gamma$	ic.								************

	LOG OF BORIN	IG N	Ο.	GB-	-42				
PROJECT :	COH Water Line Replacement in Kicker WBS No. S-000035-0185-3	illo A	rea				PRO	JECT	Г NO. : 1140194601
LOCATION :	Houston, Texas N 13843502.85, E 3049369.83	/	-•	. 0	7\		COM	IPLE	TION DEPTH : 20.0 FT.
SURFACE EL	Rancho Bauer Drive; See Plan of Boris EVATION: 71.19 FT.		- igur	e 2.	.3)		DATE	Ξ:	05-08-13
DEP	SAMPLER: Shelby Tube/Split Spoon BY AUGER: 0.0 TO 20.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5
70.2	12" Asphalt	4							
- 5-	Very stiff dark gray LEAN CLAY (CL) w/sand and ferrous stains -w/grass roots 1'-4' -hard 2'-6'	PARAMETERS OF THE PROPERTY OF THE PARAMETERS OF	0.7		13				4 0
65.2	Hard yellowish gray and brown FAT CLAY (CH) w/calcareous and ferrous nodules and ferrous stains		83	114	12	47	20	27	40
- 10-	-very stiff to hard 8'-12'				16 17				
- 15-	-very stiff 14'-16'				17				40
	-stiff to very stiff 16'-18'		87	109	19 20	55	20	35	
51.2 20	-very stiff 18'-20'				19				
- 25-									
- 30-									
- 35-									
DEPTH TO WATE NO GROUNDY HOLE OPEN	TR IN BORING: WATER ENCOUNTERED DURING DRILLING. TO 20.0 FT. AT END OF DRILLING	ieeri	ng,	Ir	ıc.				

		LOG OF BORIN	G N	10.	GB-	-43				***************************************
PROJEC		COH Water Line Replacement in Kickeri WBS No. S-000035-0185-3	llo A	rea				PRO	JEC1	NO.: 1140194601
LOCATIO	۱N! ۰	Houston, Texas N 13843985.76, E 3049344.49	an /	⊏: a		71		COM	IPLE	TION DEPTH : 20.0 FT.
SURFAC	E ELE	Rancho Bauer Drive; See Plan of Borin EVATION : 72.45 FT.	I 1	rigur	TE 2.			DAT	Ε:	05-08-13
ELEVATION, FEET	SYMBOL	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 20.0 FT. WET ROTARY: TO FT.	STANDARD PENETRATION TEST, BLOWS PER FOO	PERCENT PASSING NO. 200 SIEVE	UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	LASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIANIAL COMPRESSION
- 72.4 C		DESCRIPTION OF MATERIAL	STANDAR TEST, BL	PERCI NO.	DRY (NATURA CO	LIQUIC	PLAST	PLASTIC	△ TORVANE 0.5 1.0 1.5 2.0 2.5
72.4	77	12" Asphalt over 4" Shell - Base				14				
		Very stiff dork gray LEAN CLAY (CL) w/sand and ferrous stains —very stiff to hard 2'—4'				14				
- 5		-stiff to very stiff 4'-6' -w/calcareous nodules 4'-20' -w/vertical sand seams 6'-10'		77	115	15	46	20	26	
10		-w/ferrous nodules 8'-12' -stiff yellow and gray		anti serendadini minima manasatan ata		12 14				
		10'-14'				19				φ
- 58.4		Medium stiff to stiff gray and brown SANDY LEAN CLAY				21				40
- 54.4		(CL) w/ferrous stains		65	109	19	28	13	15	
52.4 20		Very stiff gray and reddish brown FAT CLAY (CH) w/calcareous nodules and ferrous stains	-			20				
			TO THE STREET WE SAME THE STANLE STREET SAME THE STANLE STANLE STREET SAME THE STANLE STANLE STREET SAME THE STANLE STAN							
- 25			SOCIETY SECTIONS							
- 30			AND THE PROPERTY OF THE PROPER							
- 35										
NO GR	DUNDW	R IN BORING: ATER ENCOUNTERED DURING DRILLING. TO 20.0 FT. AT END OF DRILLING. $-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!-\!$	٠ ا		r					

			LOG OF BORIN	G N	0.	GB-	-44					***************************************		
PRO	DJECT :	V	COH Water Line Replacement in Kickeril NBS No. S—000035—0185—3	lo A	rea				PRO	JECT	NO. :	1140	19460	1
LOC	CATION	: 1	Houston, Texas N 13844503.54, E 3049319.70 Rancho Bauer Drive; See Plan of Borin	ns (Figur	e 2	.3)		СОМ	PLE	TION DEF	PTH:	15.0	FT.
SUR	RFACE E	LE	VATION: 78.45 FT.	- ·	1941	C 2.	<u> </u>		DATE	: :	05-07-		D. 0705	
- 48.4 - 48.4 - 49.4 -	DEPTH, FEET	SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	רוסחום רואוד, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	△ TORVAN	PENETRO FINED O SOLIDAT L COMP	DMETER	SION
77.4	- 0		12" Asphalt											
- 76.4-			Dark gray SANDY LEAN CLAY (CL) w/roots and sand seams				12							
	- 5-		Hard dark gray FAT CLAY (CH) w/sand and ferrous stains				18							
			-hard w/ferrous nodules 2'-8' -w/calcareous nodules 4'-8'		74	122	13	52	21	31				
- 70.4-	10		\—yellow and gray 6'—8' \ Hard gray and reddish brown FAT CLAY (CH) w/ferrous		, ,	.22	20	JZ	٤ ١	,				
	- 10-		stains and calcareous nodules —medium stiff to stiff		89		30	73	29	44	40			
			10'-12' -very stiff to hard 12'-15'				23					Δ	0	
- 63.4	- 20-						23							
DEPTI	- 35- - TO W	TER	R IN BORING :											
NO	GROUN	DWA	TER ENCOUNTERED DURING DRILLING. 15.0 FT. AT END OF DRILLING. Geotest Engine	eeri	ing,	Ir	ic.	*******************************						

				LOG OF BORIN	IG N	10.	GB-	-45									
1	PROJECT: COH Water Line Replacement in Kickerillo Area PROJECT NO.: 1140194601 WBS No. S-000035-0185-3																
LO SU	CATIO	N:	+ N F\	Houston, Texas I 13842407.41, E 3049986.91 White Wing Lane; See Plan af Borings VATION: 69.55 FT.	(Figi	ure 2	2.2)			COM				PTH	: 15	5.0	FT.
ELEVATION, FEET	FEET	SYMBOL	SAMPLES	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT.	STANDARD PENETRATION TEST, BLOWS PFR FOOT		DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	LIMIT, %	INDEX, %	O H	RAINE HAND JNCON	PENET VISOLIDAL COM	ROMET COMF	ER PRESS	ION
- 69.6 69.6	ОЕРТН,			DESCRIPTION OF MATERIAL	STANDAR!	PERCE NO.	DRY L	NATURA	רוסחום	PLASTIC	PLASTICITY	Δτ	ORVA				
- 68.6	\prod^{σ}			12" Asphalt													
00.0				Medium stiff to stiff gray LEAN CLAY (CL) w/sand and ferrous stains —stiff 3'—9'			AND THE PROPERTY OF THE PROPER	15				Δ	0				
	- 5-			-w/ferrous nodules and ferrous stains 4'-15'				17					0				
								18		•		and the second s	0				
	10-			-stiff to very stirff 9'-13'		85	107	19	32	15	17	1					
								18		-			Δ	0			
				-stiff 13'-15'				18						0			
- 54.6	15-							19					AC	-			
	- 20-																
	20				and the second second second												

	- 25-																
	- 30-																
					-												:
						-											
	- 35-												<u></u>				***************************************
N	TH TO O GRO OLE O	'UND	٨A				·	·		·		L				***************************************	
···				Geotest Engin	eer	ing,	$I\gamma$	ic.							············		

	***************************************				LOG OF BORIN	1G N	10.	GB	-46		***************************************						
	PR(DJEC.	Γ:	W	COH. Water Line Replacement in Kicker VBS No. S-000035-0185-3	illo A	rea				PRO	JEC1	NO. :	114	0194	-601	
	LOC	CATIO	N :	H	louston, Texas	/					COM	IPLE	TION DE	PTH.	: 20	0.0	FT.
	SUF	RFACI	E EL	EV	White Wing Lane; See Plon of Borings /ATION : 69.75 FT.			2.2)		,	DATI	Ξ:	05-07-	-13			
	П				SAMPLER : Shelby Tube/Split Spoon	STANDARD PENETRATION TEST, BLOWS PER FOOT	E ING	H,	JRE	к	88	, %	UNDRAIN O HAND				GTH,
	Ä, FE	FEET	SYMBOL	SAMPLES	DRY AUGER : 0.0 TO 20.0 FT. WET ROTARY : TO FT.	PENETI S PER	PASS 0 SIEV	UNIT WEIGHT,	MOISTL		LIMIT,	INDEX,	UNCO				ION
	ELEVATION, FEET	оєртн,	SYA	SAN		ARD F	PERCENT PASSING NO. 200 SIEVE	DRY UNI	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT,	PLASTIC	PLASTICITY	UNCO TRIAXI		ATED-I	UNDR/ SION	AINED
	ਜ਼ੋ 69.8-				DESCRIPTION OF MATERIAL	STAND TEST,	A _N	P.O.	NATI	רוט	J.	PLA	△ TORVA 0.5	NE 1.0 1.	.5 2.0	0 2.	5
ŀ	68.9-		XX		10.5" Asphalt	~											
			\bigotimes		FILL: medium stiff to stiff brown and gray fat clay				22				Q <u>\$</u>				
			\bigotimes	M	w/sand seams -medium dense brown sand 2'-4'	21			14								
		- 5-	\bigotimes		-clay and sand mix 4'-6'				25					-			
r	63.8-		X		Stiff to very stiff gray	-			25								
					and brown FAT CLAY (CH) w/ferrous nodules and ferrous stains		87	108	20	54	22	32		*			
		- 10-			-very stiff 8'-10' -w/sand seams 8'-14'				17								
		10			-w/solid seallis 0-14												
					-stiff 12'-14'				20					4			
L	55.8								19				40				
		- 15-			Stiff to very stiff gray and yellowish brown LEAN		80	110	18	49	19	30					
					CLAY (CL) w/sand and silt seams				, ,	(3	, 3	30					
					-very stiff 16'-18' -very stiff to hard 18'-20'				22						A O		
	49.8-	- 20-							16							0	
	70.0																
		- 25-															
						-											
	ļ	- 30-															
	}																
		- 35-											L	<u></u>		1	
	DEPTI	H TO	WATI	ER WAT	IN BORING : TER ENCOUNTERED DURING DRILLING.	<u> </u>	L	I	L	1							
	HÖ	LE O	PEN	Τò	20.0 FT. AT END OF DRILLING. Geotest Engin	.eerr	່າກ.ຕ	Ιν	n C								
					= 5 5 5 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1		,	~ .	٠.								

PROJECT C.O. Water Line Replacement in Kickerillo Arac WBS No. 5-000035-0185-3		LOG OF BORI	NG NO.	GB-	-47			
SURFACE ELEVATION 17 0.79 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. SAMPLER : Shelby Tube/Split Spoon DPY AUGER : 0.0 TO 15.0 F1. Sampler Split Split Split Spoon DPY AUGER : 0.0 TO 15.0 F1. Sampler Split S		WBS No. S-000035-0185-3	rillo Area	***************************************		PRC	JEC ⁻	T NO. : 1140194601
12" Asphalt Stiff to very stiff gray and brown LEAN CLAY (CL) W/colcareous nadules 19	LOCATION : SURFACE ELE	Houston, Texas N 13843409.84, E 3049930.89 White Wing Lane; See Plan of Borings EVATION : 70.79 FT.	: (Figure 2	2.3)				
Stiff to very stiff gray and brown LEAN CLLY (CL) w/colcareous nodulesvery stiff 2'-6' -gray 2'-12' -w/ferrous nodules 4'-15' -w/ferrous nodules 4'-15' -very stiff 8'-10' -10101010101010-		DRY AUGER: 0.0 TO 15.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	ے ا		O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION A TORVANE
NOTED TO WATER IN RORING :	- 55.8- 15- - 20- - 25- - 30- - 35-	Stiff to very stiff gray and brown LEAN CLAY (CL) w/calcareous nodules -very stiff 2'-6' -gray 2'-12' -w/ferrous nodules 4'-15' -very stiff 8'-10' -gray and brown w/sand and silt seams 12'-15'		107	19 19 19 20 21 20	49 21	28	

PROJECT : COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3				
		Р	ROJEC	Г NO. : 1140194601
Houston, Texas LOCATION: N 13843798.31, E 3050037.51	`	С	OMPLE	TION DEPTH : 20.0 FT.
White Wing Lone; See Plan of Borings (Figure 2.3) SURFACE ELEVATION: 71.20 FT.) 	D	ATE :	05-07-13
SYMBOL SYMBOL SYMBOL SYMBOL SYMBOL SAMPLES PCF NATURAL MOISTURE CONTENT, %	IMIT, %	PLASTIC LIMIT, % PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, TSF O HAND PENETROMETER UNCONFINED COMPRESSION UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION A TORVANE 0.5 1.0 1.5 2.0 2.5	
71.2 0 12" Asphalt				
FILL: very stiff gray fat clay w/sand —medium dense brown silty sand 2'-6'	18			40
-stiff w/vertical sand seams and roots 6'-8'	13			
Stiff to very stiff gray FAT CLAY (CH) w/calcareous and ferrous nodules and ferrous stains	10 20	58	23 35	
-very stiff 10'-14' -gray and yellowish brown 10'-18' -slickensided 14'-16'	23			40
- 15very stiff 16'-18'	08 20			
Stiff to very stiff gray and yellowish brown SANDY LEAN CLAY (CL) w/sand and silt seams	18	37	16 21	
- 25-				
- 30-				
- 35-		***************************************		
DEPTH TO WATER IN BORING: NO GROUNDWATER ENCOUNTERED DURING DRILLING. HOLE OPEN TO 20.0 FT. AT END OF DRILLING. Geotest Engineering, I	Inc.			

PROJEC [*]	Γ:	LOG OF BORIN COH Water Line Replacement in Kickeri			GB-	-49	(G			<u></u>). :	1140	194	601
LOCATIO SURFACI	N :	WBS No. S-000035-0185-3 Houston, Texas N 13844278.18, E 3050013.93 White Wing Lane; See Plan of Borings EVATION: 72.30 FT.			2.3)				PLE"	TION	DEF	PTH :		
ELEVATION, FEET DEPTH, FEET	SYMBOL	SAMPLER: Shelby Tube/Split Spoon DRY AUGER: 0.0 TO 20.0 FT. WET ROTARY: TO FT. DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT		DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	UND O F	RAINEI HAND F JNCON JNCON RIAXIA TORVAN	D SHE TSF PENETR FINED SOLIDA L COM	COMET COMP TED-I PRES	ER RESSIG UNDRA SION
- 71.3 - 5- - 10- - 60.3 - 15- - 25- - 30- - 35-		To.5" Asphalt over 1.5" Gravel and Sand Mix Medium stiff to stiff gray LEAN CLAY (CL) w/sand, ferrous stains and ferrous nodules -stiff 2'-4' -stiff to very stiff 4'-8' -w/calcareous nodules 4'-12' -gray and brown 4'-12' -stiff 8'-10' -very stiff gray and brown FAT CLAY (CH) w/sand, ferrous nodules and ferrous stains -stiff to very stiff 16'-18' -very stiff to hard reddish brown and gray, slickensided 18'-20' NOTE: See Piezometer GB-49P for water level measurements.		72	117	18 20 16 15 22 23	49	19	30			Δ Q	0	0

				LOG OF BORI	NG N	10.	GB-	-50							
F	PROJEC'	Γ:	COH Water Line Rep WBS No. S-000035-	lacement in Kicke -0185-3	erillo A	rea				PRO	JECT	NO. :	1140	0194	601
	OCATIO	N :	Houston, Texas N 13844731.14, E 3	3049992.74	. (E:a	ro ^c) Z\			COM	IPLE	TION DI	EPTH	: 15.	.0 FT.
5	SURFACI	E EL	White Wing Lane; Se EVATION : 74.90 FT.	e Plan of Borings	s (rigu	re z	····			DATE	€ :	05-07-			
ELEVATION, FEET	ОЕРТН, FEET	SYMBOL	SAMPLER: Shelby BY AUGER: 0 WET ROTARY: -	.0 TO 15.0 FT.	ARD PENETRATION BLOWS PER FOO	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT,	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	O HAND UNCC	PENET INFINED	ROMETE COMPF	ER .
i			DESCRIPTION	OF MATERIAL	STAND, TEST,	PER	DRY	NATU	ΙĞΙ	PLA	PLAS	△ TORV. 0.5	ANE 1.0 1.	5 2.0	2.5
- 74 - 73			12.5" Asphalt												
			Stiff gray and ye LEAN CLAY (CL) seams		Andrew State Control of the Control			27				40			
	- 5-		-stiff to very st -w/ferrous nodu ferrous stains -very stiff 4'-10	les and 2'-15'				18					0		
			very Suit 4 - 10	,				15					Q Q		
	- 10-		-stiff to very st	iff 10'-12'				15					4		
			-w/calcareous n 10'-15' -very stiff 12'-1			70	118	16	40	16	24	4	70		
50	.9 - 15-							15 16					ΔΟ		
J 55.	.9 13														
	- 20-														
	- 25-														
	- 30-														
	- 35-														
UE	PTH TO	TAW	R IN BORING :												
	NO GRO	UNDI	ATER ENCOUNTERED DU TO 15.0 FT. AT END O	F DRILLING.			_								
America and a second		-		Geotest Engi	neeri	ng,	In	c.							

Asphaltic

Concrete

SYMBOLS AND TERMS USED ON BORING LOGS

SOIL TYPES
(SHOWN IN SYMBOL COLUMN)

(SHOWN IN SAMPLES COLUMN)

Predominant type shown heavy

TERMS DESCRIBING CONSISTENCY OR CONDITION

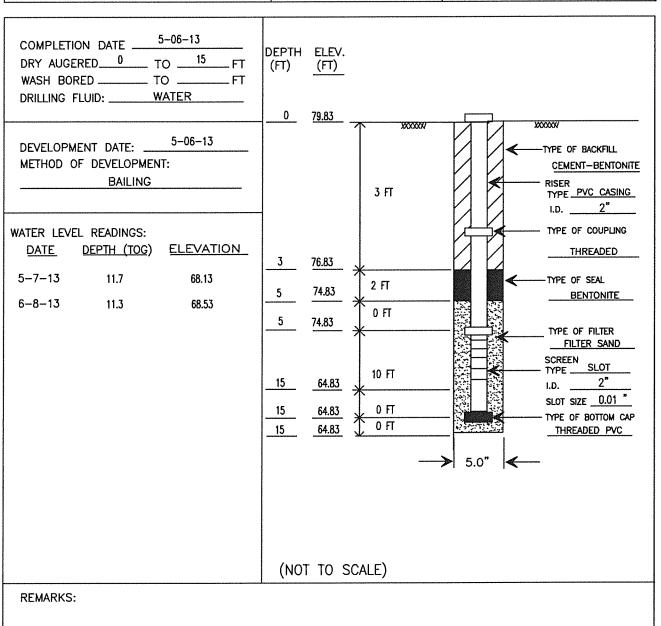
B <u>asic Soil</u> Type	<u>Density or</u> Consistency	Standard Penetration Resistance, ⁽¹⁾ Blows/ft.	Unconfined Compressive Strength (q _u), ⁽²⁾ Tons/sq. ft.
Cohesionless	Very loose	Less than 4	Not applicable
	Loose	4 to <10	Not applicable
	Medium dense	10 to <30	Not applicable
	Dense	30 to <50	Not applicable
	Very dense	50 or greater	Not applicable
Cohesive	Very soft	Less than 2	Less than 0.25
	Soft	2 to <4	0.25 to <0.5
	Firm/Medium stiff	4 to <8	0.5 to <1.0
·	Stiff	8 to <15	1.0 to <2.0
	Very stiff	15 to <30	2.0 to <4.0
	Hard	30 or greater	4 or greater

- (1) Number of blows from 140-lb. weight falling 30-in. to drive 2-in. OD, 1-3/8-in. ID, split barrel sampler (ASTM D1586)
- (2) qu may also be approximated using a pocket penetrometer

TERMS CHARACTERIZING SOIL STRUCTURE

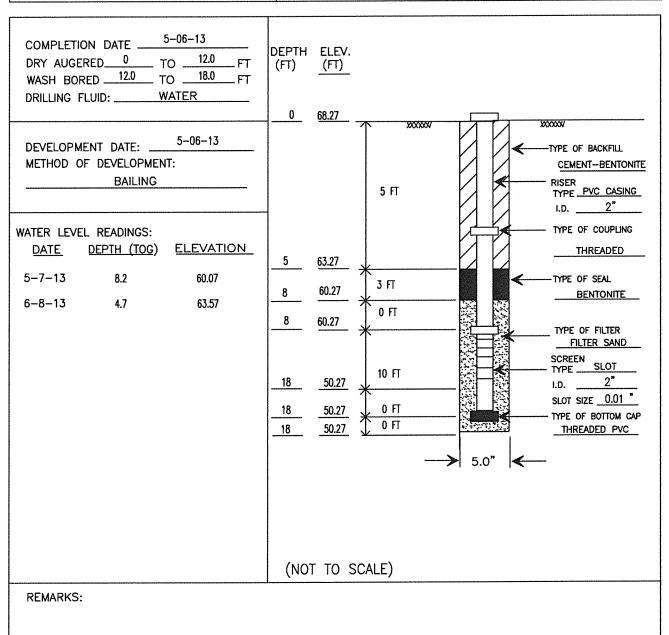
Parting: -paper thin in size	Seam: -1/8" to 3" thick	Layer: -greater than 3"
Slickensided	 having inclined planes of weaks appearance. 	ness that are slick and glossy in
Fissured Laminated	 containing shrinkage cracks, free usually more or less vertical. composed of thin layers of vary 	equently filled with fine sand or silt;
Interbedded	- composed of alternate layers of	f different soil types.
Calcareous .	 containing appreciable quantitie 	
Well graded	 having wide range in grain sizes intermediate particle sizes. 	s and substantial amounts of all
Poorly graded	 predominantly of one grain size intermediate size missing. 	, or having a range of sizes with some
Flocculated	•	exhibit a loose knit or flakey structure.

PROJECT NAME: COH Water Line Replacement WBS No. S-000035-01185-3	on Kickerillo Area	PIEZOMETER NUMBER: GB-1P
	DESIGN CONSULTANT JCI	HOUSTON, TEXAS



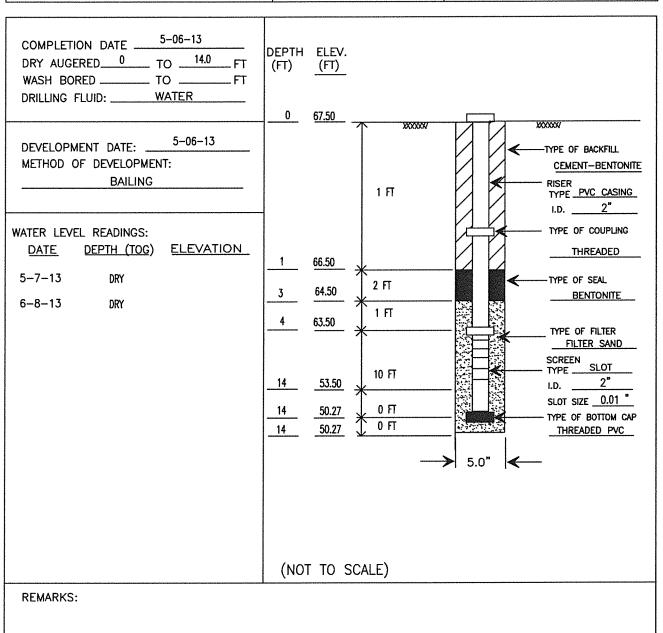
NOTES: 1. DIMENSIONS NOMINAL UNLESS	DRILLED BY: DG	STARTED: 5-6-13	NORTHING: 13844243.94 EASTING: 3046683.66
OTHERWISE NOTED 2. TOG = TOP OF GROUND	LOGGED BY: TM	COMPLETED: 5-6-13	GROUND LEVEL (MSL): 79.83
	CHECKED BY: NK	APPROVED BY: MB	SHEET <u>1</u> OF <u>1</u>

PROJECT NAME: COH Water Line Replacement of WBS No. S-000035-0185-3	on Kickerillo Area	PIEZOMETER NUMBER: GB-22P
GEOTECHNICAL CONSULTANT GEOTEST ENGINEERING, INC.	DESIGN CONSULTANT JCI	HOUSTON, TEXAS



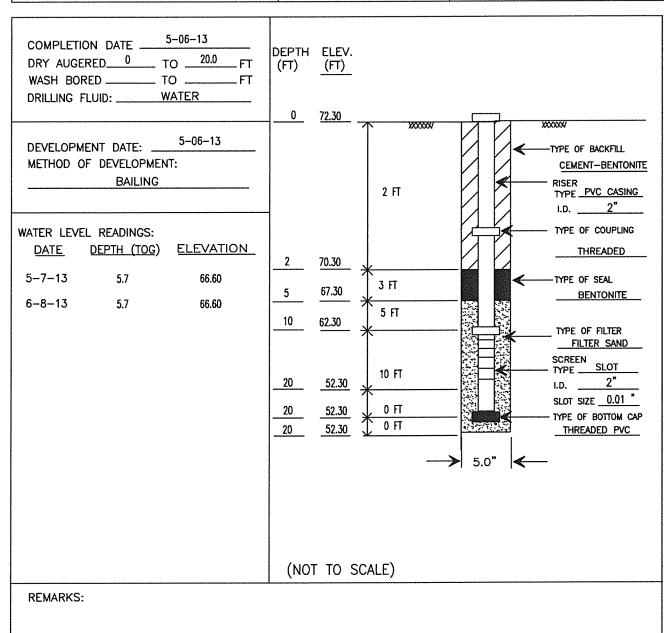
NOTES: 1. DIMENSIONS NOMINAL UNLESS	DRILLED BY: DG	STARTED: 5-6-13	NORTHING: 13842946.14 EASTING: 3048243.63
OTHERWISE NOTED 2. TOG = TOP OF GROUND	LOGGED BY: TM	COMPLETED: 5-6-13	GROUND LEVEL (MSL): 68.27
	CHECKED BY: NK	APPROVED BY: MB	SHEET <u>1</u> OF <u>1</u>

PROJECT NAME: COH Water Line Replacement of WBS No. S-000035-0185-3	on Kickerillo Area	PIEZOMETER NUMBER: GB-36P
GEOTECHNICAL CONSULTANT GEOTEST ENGINEERING, INC.	DESIGN CONSULTANT JCI	HOUSTON, TEXAS



NOTES: 1. DIMENSIONS NOMINAL UNLESS	DRILLED BY: DG	STARTED: 5-6-13	NORTHING: 13841495.30 EASTING: 3050236.19
OTHERWISE NOTED 2. TOG = TOP OF GROUND	LOGGED BY: TM	COMPLETED: 5-6-13	GROUND LEVEL (MSL): 67.50
	CHECKED BY: NK	APPROVED BY: MB	SHEET <u>1</u> OF <u>1</u>

PROJECT NAME: COH Water Line Replacement WBS No. S-000035-0185-3	on Kickerillo Area	PIEZOMETER NUMBER: GB-49P
GEOTECHNICAL CONSULTANT GEOTEST ENGINEERING, INC.	DESIGN CONSULTANT JCI	HOUSTON, TEXAS



NOTES: 1. DIMENSIONS NOMINAL UNLESS	DRILLED BY: DG	STARTED: 5-6-13	NORTHING: 13844278.18 EASTING: 3050013.93
OTHERWISE NOTED 2. TOG = TOP OF GROUND	LOGGED BY: TM	COMPLETED: 5-6-13	GROUND LEVEL (MSL): 72.30
	CHECKED BY: NK	APPROVED BY: MB	SHEET <u>1</u> OF <u>1</u>

APPENDIX B

	rigure
Summary of Laboratory Test Results	B-1 thru B-50
Grain Size Distribution Curves.	B-51 and B-52

	SUMA	AARY OI	F LABOR		SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	ì	COH Wa	ter Line Rep S-000035	olaceme -0185-	nt in K	ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	FINEE	ERING, INC.			PRO	PROJECT	NUME	Houston, 3ER: 11401	Houston, Texas NUMBER: 1140194601		ı			
		SAN	SAMPLE					ATTI	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		De (†	Depth (ft.)			WATER	DRY	1	i	i	PASSING NO. 200		Sheor	1	Shear	Sheor	
NO.	Š.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENI (%)	DENSILY (pcf)	Ⅎ	<u>. </u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-1 (GB-1P)) 2	0.5	2.0	an		15									1.13	2.25	Lean Clay
	3	2.0	4.0	an O		12									1.50	2.25	Lean Clay
	4	4.0	6.0	an		12	122	43	16	27	72		2.72	0.43	2.00	2.25	Leon Cloy
	5	6.0	8.0	an		21									1.75	2.25	Lean Clay
	9	8.0	10.0	an		23	103	11	26	45	93		1.75	0.72	1.75	2.25	Fat Clay
	7	10.0	12.0	an		23									1.88	2.25	Fat Clay
	80	12.0	14.0	ΩŊ		29									1.75	2.25	Fat Clay
	6	14.0	15.0	an		23			ļ 						2.00	2.25	Fat Clay
			_														
LEGEND:	N B A S S S S S S S S S S S S S S S S S S	SPLIT SI AUGER (PITCHER Nx-DOUI	= UNDISTURBED SAMPLE, EXTRUDE = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = Nx—DOUBBLE BARREL SAMPLE	APLE, E PLE SAMPLE REL SA	<u>z</u>	FIELD		SPT PP " " "	= Star 	ndard F iid Limi stic Lirr ticity In	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
	1			-												-	

S	лмм,	ARY OF	' LABOF	MATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC WBS No	ter Line Re . S-000035	placeme -0185-	nt in K	ickerillo	Area	
l		CEOTE	CEOTEST ENCINEERING,	TINEE	RING, INC.			PRO	PROJECT		Houstor BER: 1140	Houston, Texas NUMBER: 1140194601)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	၁၃		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		Depth (ft.)	oth t.)			WATER	DRY		i	i	PASSING NO. 200	Shear	Shear	Conf.	Shear	Shear	
	ė Š	Тор	Bottom	Туре	(blows/ft.)	CONIENI (%)	DENSILY (pcf)	<u> </u>	<u>z</u>	<u> </u>	Sieve (%)	Strength (ts/)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
	2	0.5	2.0	an		16									1.00	1.50	Lean Clay
	5	2.0	4.0	On .		16									1.13	1.38	Lean Clay
	4	4.0	6.0	an		15									1.50	1.75	Lean Clay
	ς.	6.0	8.0	On		19	108	44	16	28	79		0.87	0.58	1.25	1.13	Lean Clay
	9	8.0	10.0	On		19									1.25	1.13	Lean Clay
	7	10.0	12.0	an		30									1.25	1.75	Fat Clay
	80	12.0	14.0	an		17									0.63	1.63	Lean Clay
																	and the state of t
L																	

JOŠUŽ	SSS AG = 1	UNDISTUI SPLIT SP AUGER C PITCHER	RBED SAN COON SAM CUTTINGS BARREL (BARREL (APLE, E PLE SAMPLE SFI SAI	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS TICHER BARREL SAMPLE Nx-DOURRIF BARRE! SAMPLE	FIELD		요 고 	= Stor = Liqu = Plos = Plos	ndard I Jid Limi Stic Lin	Standord Penetration Test Liquid Limit Plostic Limit Plosticity Index	lest					
			***************************************				7								***************************************		

	SUMA	AARY O	F LABOF	SATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO.	JECT	PROJECT NAME:	COH Wa WBS No.	NAME: COH Water Line Replacement WBS No. S-000035-0185-3	placeme -0185-	.⊑	Kickerillo	Area	
		CEOT	CEOTEST ENCINEERING,	SINE	RING, INC.			PRO.	PROJECT	NUME	Houston 3ER: 11401	, Texas 194601					
		SAI	SAMPLE					ATTI	ATTERBERG LIMITS	ပ္က		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
0 2		De (Depth (ft.)			WATER	DRY	1			PASSING NO. 200	1	Shear		Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	(blows/ft.)	CONIENI (%)	DENSIIY (pcf)	∃	 굽	<u> </u>	Sieve (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-3	2	0.5	2.0	an		13									0.75	1.25	Sandy Lean Cloy
	3	2.0	4.0	an		13									1.75	2.25	Sandy Lean Clay
	4	4.0	6.0	g		14		42	14	28	70				1.50	1.75	Sondy Lean Clay
	5	6.0	8.0	an		15									1.00	1.75	Sandy Leon Clay
	9	8.0	10.0	g		17									0.75	1.50	Sandy Lean Cloy
	7	10.0	12.0	g		25	103	59	23	36	87		1.30	0.86	1.50	1.50	Fot Clay
	ω	12.0	14.0	an		31									1.50	1.63	Fat Clay
									<u> </u>								
							-										

LEGEND:	SS AX		UNDISTURBED SAMPLE, EXTRUDED SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE N-DOJIBRI F BARRE! SAMPLE	APLE, E IPLE SAMPLE	<u>z</u>	FIELD		유민	= Stan = Liqui = Plas = Plast	dard Fide Limi	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
			: ! !	וורר	MAIL CL												

	SUMM	IARY OI	F LABOF	RATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	ł	E: COH WC WBS No	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	placeme -0185-	int in 1	(ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	CINE	ERING, INC.			PRO	PROJECT		Houstor BER: 1140	194601					
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	၁၃		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE – TROMETER	
0		De (†	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200	Shear	0,	Conf.		Shear	
NO.	Š.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)		<u>L</u>	Ē.	Sieve (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB−4	2	0.5	2.0	9		15									1.13	1.50	Lean Clay
	3	2.0	4.0	9		17									0.88	1.13	Lean Clay
	4	4.0	6.0	9		22	112	46	20	26	79		1.12	0.43	1.25	1.25	Lean Clay
	5	6.0	8.0	an		24									1.50	1.50	Fat Clay
	9	8.0	10.0	gn		25		63	24	39	98				2.00	2.00	Fat Clay
	7	10.0	12.0	UD		18									2.00	2.00	Fat Clay
	∞	12.0	14.0	UD		21									2.25	2.25	Fat Clay
	*******																And the first water through the contract of th
												THE PARTY OF THE P					
											TOTAL THE PARTY AND THE PARTY					A CAN MANAGEMENT OF THE PROPERTY OF THE PROPER	AND THE RESIDENCE OF THE PROPERTY OF THE PROPE
LEGEND:	SS AG	UNDISTL SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTINGS = PITCHER BARREL SAMPLE = NY-DOJIRRI F RARPET SAMPLE	APLE, IPLE SAMPLI	Z.	FIELD		8 1 1 1 1	= Stor = Liqu = Plas	ndard Jid Lim Stic Lir iticity I	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	Fest					
	1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	מטור טייי	7.1.	YMF LE		-										

	SUMN	(ARY OF	7 LABOR	PATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO.	JECT	PROJECT NAME: COP	Water No. S.	Line Rep -000035-	laceme -0185-	ri Fr	ickerillo	Area	
		GEOTEST		SINEE	ENGINEERING, INC.			PRO.	PROJECT	Houston, Texas NUMBER: 1140194601	uston, Te	exas 601)			
		SAN	SAMPLE					ATTI	ATTERBERG LIMITS	(2)	CONC	UNCONFINED COMPRESSION TEST	TRIA COMPR TEST	TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
BORING		De (t	Depth (ft.)			WATER	DRY DENSITY	٦	<u>ا</u>	PASSING NO. 200 PI SIEVE		Shear	Shear		Shear	Sheor	
NO.	No.	Тор	Bottom	Туре	(blows/ft.)	(%)	(pct)	- 1	,				(tsf)		(tsf)	(tsf)	TYPE OF MATERIAL
CB-5	2	0.5	2.0	Ωn		23									0.75	0.88	Fat Clay
	3	2.0	4.0	ΩΩ		20		52	21	31 87					0.80	0.88	Fat Clay
	4	4.0	6.0	an		19									1.00	1.00	Fat Clay
	2	6.0	8.0	g		19									1.00	0.75	Fat Clay
	9	8.0	10.0	S		21	105	55	22	33 97			0.71	0.72	1.00	1.13	Fat Cloy
	7	10.0	12.0	gn		22									2.00	2.25	Fat Clay
	80	12.0	14.0	G S		20									2.00	2.25	Fat Clay

LEGEND:	SSS X N B B K N	SPLIT SF AUGER C PITCHER Nx-DOU!	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTINGS = PITCHER BARREL SAMPLE = Nx—DOUBBLE BARREL SAMPLE	APLE, E IPLE SAMPLE REL SAN	ED IN	FIELD		SPT == LL == PI ==		Stondard Penetrotion Test Liquid Limit Plostic Limit Plasticity Index	tion Test						
	1					***************************************											

	SUMA	IARY OI	F LABOF	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAME	COH Wa	ter Line Re	placeme -0185-	Ξ.	Kickerillo	Area	
THE PROPERTY COLD AND ADMINISTRATION OF THE PROPERTY COLD AND ADMINISTRATION OF THE PROPERTY COLD ADMI		GEOTE	ST EN	SINEE	GEOTEST ENGINEERING, INC.			PRO.	PROJECT	NUME	Houston 3ER: 1140	Houston, Texas NUMBER: 1140194601		ז			
		SAN	SAMPLE					ATT.	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE – TROMETER	
CHAGO		De (1	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200	Shear	"	Conf.		Shear	-
NO.	Š.	Тор	Bottom	Туре	SPI (blaws/ft.)	CONIENI (%)	DENSITY (pcf)	∃	ਰ	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-6	2	0.5	2.0	an		20									1.00	0.88	Lean Clay
	3	2.0	4.0	an		20	104	49	19	30	76		0.58	0.29	08.0	0.88	Lean Clay
	4	4.0	6.0	9		18									1.25	1.13	Lean Clay
	က	6.0	8.0	an		18									1.25	1.00	Lean Clay
	ဖ	8.0	10.0	g		25	102	64	25	39	91		0.78	0.72	1.25	1.25	Fat Clay
	7	10.0	12.0	an		25									2.50	2.25	Fat Clay
	ω	12.0	14.0	gn		26									2.50	2.25	Fot Clay
	o	14.0	15.0	g		22											Fat Clay
												obside de contrace de contraction de la contract					
												THE THE PROPERTY OF THE PROPER					
												-					
											.•						
LEGEND:	SS AS A	SPLIT SE AUGER C PITCHER	JRBED SAN POON SAM SUTTINGS BARREL BARREL	APLE, E	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS RICHER BARREL SAMPLE NUMBER BARREL SAMPLE	FIELD	A-810-7-3		= Star = Liqu = Plos	ndard Fid Limi	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
		NX - USC	ייאט סטרב	קר ק	MFLE					-							

<i>3.</i>	SUMIN	ARY OF	7 LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		COH Wa WBS No.	ter Line Reg . S-000035	placeme -0185-	. <u>.</u> .	Kickerillo	Area	
		CEOTE	CEOTEST ENGINEERING,	TINEE	RING, INC.			PRO	PROJECT		Houston 3ER: 11401	Houston, Texas NUMBER: 1140194601))			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည္က		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
SNIGOR		De (†)	Depth (ft.)			WATER	DRY		ā	i	PASSING NO. 200	1	Shear	Conf.	Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	(blows/ft.)	CONTENT (%)	(pcf)	∃	ਜ	ī.	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-7	2	0.5	2.0	9		12									2.25	2.25	Lean Clay
	3	2.0	4.0	an		13					Programma de la companya de la compa		-		2.00	2.25	Lean Clay
	4	4.0	6.0	S		14		46	20	26	80				2.00	2.25	Lean Clay
	S.	6.0	8.0	On.		22					:				1.75	1.75	Lean Clay
	9	8.0	10.0	9		25	102	75	28	47	06		1.26	0.72	1.38	1.25	Fat Clay
	7	10.0	12.0	an		23									1.50	1.63	Fat Clay
	∞	12.0	14.0	an		21									1.13	0.88	Lean Clay
	6	14.0	15.0	an		22									0.63	1.00	Lean Clay
																	on to the control of
-											The second secon	The state of the s					
																	Actual and the second s
													THE THE PROPERTY OF THE PROPER				
												THE PARTY OF THE P				The state of the s	
LEGEND:	SSS AG N		IRBED SAN 200N SAM 2UTTINGS BARREL S	APLE, E PLE SAMPLE SEL SA	UNDISTURBED SAMPLE, EXTRUDED IN FIELD SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE NX—DOUBBLE BARREL SAMPLE	ELD		않 다 교	= Stor = Liqu = Plos = Plos	ndord F id Limi stic Lirr ticity In	Standord Penetration Test Liquid Limit Plostic Limit Plosticity Index	est	·				

31	SUMM	[ARY OF	F LABOR	PATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	ı	E: COH Wo	ter Line Re . S-000035	placeme -0185-	nt in k	in Kickerillo Area	Area	
77.00		CEOTE	CEOTEST ENCINEERING,	SINEE	ERING, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601					
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	25		UNCONFINED COMPRESSION TEST	l	TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE— TROMETER	
BORING	2	Oel (f	Depth (ft.)	Ty C	SPT (H)	WATER CONTENT	DRY DENSITY	7	P.	Ē	PASSING NO. 200 SIEVE	Shear Strength	Shear Strength	Conf. Press.	Shear Strength	Shear Strength	TYPE OF MATERIAL
GB-8	2	0.5	2.0	2, 3	(a) (amaza)	23	(ind)				(%)		(ie)		0.75	0.63	
	ъ	2.0	4.0	9		21									0.75	0.75	Fot Cloy
	4	4.0	6.0	9		20	110	57	17	40	79		1.26	0.43	1.00	1.25	Fat Clay
	2	6.0	8.0	g		24									1.00	1.13	Fot Cloy
	ယ	8.0	10.0	Gn		24									1.00	1.13	Fot Clay
	7	10.0	12.0	9		23	106	46	21	25	06		1.00	0.86	1.00	1.25	Lean Clay
	œ	12.0	14.0	9		20									1.00	1.75	Lean Clay
	б	14.0	15.0	an		21								***************************************	0.75	0.63	Lean Clay
LEGEND:	SS AG ===	SPLIT SI AUGER C PITCHER	JRBED SAN POON SAM SUTTINGS BARREL (BRI F BARR	MPLE, I IPLE SAMPLE RFI SA	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS TICHER BARREL SAMPLE NX-DOURRIF RARREI SAMPLE	FIELD		ST T T T T T	Sto Ligu	indord Jid Lim stic Lin	Standord Penetration Test Liquid Limit Plostic Limit Plasticity Index	lest					
		- 1	בור ב	ן ני	NIVI CE					-							

	SUMM	IARY OF	LABOF	NATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAME:	E: COH WG	ter Line Re S-000035	placeme -0185-		Kickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	SINEE	RING, INC.			PRO.	PROJECT	NOM	Houston BER: 1140	Houston, Texas NUMBER: 1140194601))			
		SAN	SAMPLE					EA U	ATTERBERG LIMITS	ပ္ပ		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		Dej (†	Depth (ft.)			WATER	DRY	1			PASSING NO. 200	Shear	0,	Conf.	1	Shear	
NO.	Š	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	∃	ਰ	<u>. </u>	SiEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
6 -8 9	2	9.0	2.0	an		15											Sandy Lean Clay
	3	2.0	4.0	9		14									2.50	2.25	Fot Clay
	4	4.0	6.0	an		13									2.50	2.25	Fat Cloy
	2	6.0	8.0	an		17	111	9	24	36	06		0.93	0.58	0.80	1.00	Fat Cloy
	9	8.0	10.0	On O		20									1.50	1.50	Fat Cloy
	7	10.0	12.0	9		19									0.75	0.75	Sandy Lean Clay
	8	12.0	14.0	gn		20					50						Sandy Lean Clay
	δ	14.0	15.0	ON.		19									0.63	1.75	Sandy Lean Clay
	10	15.5	17.0	SS	27	23											Clayey Silt
	7	17.0	18.0	On		20	106	27	21	9	91		0.49	1.30	0.63	1.88	Silty Cloy
	12	20.0	22.0	an		18									0.63	1.75	Silty Clay
											THE REAL PROPERTY AND						
LEGEND:	SSS SX	UNDISTU SPLIT SF AUGER C PITCHER	UNDISTURBED SAMPLE, EXTRUDED SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE N>—DOJIBRI F BARRE! SAMPLE	APLE, E	<u>z</u>	FIELD		PPL SPL	= Stan = Liqui = Plas = Plast	dard id Lim itic Lin ticity Is	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
	1	2	ָּבְּרָי בְּיִבְּיִ		MIT LL		-										

	SUMM	IARY OF	7 LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		: COH WG	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	olaceme -0185-	ant in k	(ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	NINEE	RING, INC.			PRO	PROJECT	NUMB	Houston IER: 1140	, Texas 194601		•			
		SAN	SAMPLE					TTA L	ATTERBERG LIMITS	ပ		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
0		De (¢	Depth (ft.)			WATER				T	PASSING NO. 200	1	Shear	Canf.	Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	(blows/ft.)	CONIENI (%)	DENSITY (pcf)	-			SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-10	2	0.5	2.0	an		17									1.25	1.50	Lean Clay
	3	2.0	4.0	an		16									1.25	1.75	Lean Clay
	4	4.0	6.0	On .		20									1.00	1.25	Lean Clay
	S	6.0	8.0	9		19									1.00	1.25	Lean Clay
	9	8.0	10.0	9		22	106	53	22	31	82		0.97	0.72	0.75	0.75	Fat Clay
	7	10.0	12.0	an		21									1.00	1.13	Fot Cloy
	80	12.0	14.0	S		21									09.0	0.75	Lean Clay
	ō	14.0	15.0	g		23									0:30	0.25	Lean Clay
							Approximation of the Control of the								The state of the s		THE RESIDENCE OF THE PROPERTY
							The second secon										
													The state of the s	-			
												OPPORTUNITIES OF THE PROPERTY AND THE PROPERTY OF THE PROPERTY					The state of the s
LEGEND:	SS AG	UNDISTU SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDIS = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = NY-DOURRE FRAREL	PLE, E	EXTRUDED IN FIELD E.E.	TELD		A 무 교	= Stan = Liqui = Plos	id Limit tic Limit icity Inc	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
-	1	7 V	יייים	11	IMF LC						***************************************						

	SUMA	AARY OI	F LABOF	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH Wa	ter Line Re	olaceme -0185-	Ë	Kickerillo Area	Area	
		CEOTE	CEOTEST ENGINEERING,	SINE	SRING, INC.			PRO	PROJECT	N N N	Houston BER: 1140	Houston, Texas NUMBER: 1140194601	5	ז			
		SAS	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE TROMETER	
CNIGCO		De	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200	1	Shear	Conf.	ı	Shear	
NO.	No.	Тар	Bottam	Туре	SPI (blaws/ft.)	CONTENT (%)	DENSITY (pcf)	=	۲	₫.	Sieve (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-11	2	0.8	2.0	an		14									1.50	2.25	Lean Clay
	3	2.0	4.0	g		15									1.50	2.25	Lean Clay
	4	4.0	6.0	9		26	102	61	25	36	84		1.18	0.43	1.25	1.25	Fat Cloy
	5	6.0	8.0	gn		28									0.88	1.00	Fat Clay
	9	8.0	10.0	9		31									0.88	1.00	Fat Cloy
	7	10.0	12.0	GN		18									1.38	2.00	Lean Clay
	80	12.5	14.0	SS	12	21					99						Sandy Silt
	б	17.5	19.0	SS	100/4.5"	19											Sandy Silt
												THE REAL PROPERTY AND ADDRESS OF THE PARTY AND					
									-								And the state of t
LEGEND:	SS SS XX		JRBED SAN POON SAM SUTTINGS BARREL	APLE, EPLE	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS PITCHER BARREL SAMPLE Nx—DOURRIF BARREI SAMPLE	FIELD		SP TP TP	= Stan = Liqui = Plas = Plast	ndard id Lim stic Lin ticity Ir	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
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	SUMM	IARY OI	r LABOF	LATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	E: COH WC WBS No	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	olaceme -0185-	nt in k	ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	SINE	FRING, INC.			PRO	PROJECT	N	Houston BER: 1140	i, Texas 194601					
		SAN	SAMPLE					ATT L	ATTERBERG LIMITS	၁၃		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
CNIGO		De (f	Depth (ft.)			WATER	DRY	l	č	l i	PASSING NO. 200	1	Shear	Canf.	Shear	Shear	
NO.	No.	Тор	Bottam	Туре	(blows/ft.)	CONIENI (%)	(pcf)		 	ī	SiEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-12	2	0.8	2.0	Ωn		16									1.13	1.38	Lean Clay
	3	2.0	4.0	an		17									0.88	1.13	Lean Clay
	4	4.0	6.0	an		27	101	64	25	39	84		0.62	0.43	08.0	0.88	Fat Clay
	5	6.0	8.0	g,		23									1.50	1.25	Fat Clay
	9	8.0	10.0	an		21									0.88	1.38	Silty Clay
	7	10.0	12.0	an		22	114						0.27	0.86	0.20	0.50	Silty Clay
	ω	12.0	14.0	an		19											Clayey Silt
													THE				
															;		
LEGEND:	BAG SS BB BB	UNDISTUSPLIT SE AUGER C	= UNDISTURBED SAMPLE, EXTRUDI SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE PITCHER BARREL SAMPLE	APLE, IPLE SAMPLE	EXTRUDED IN FIELD	IELD		SPT	= Star = Liqu = Plas = Plas	ndard iid Lim stic Lin ticity Ir	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	Fest					
	11	NX-NOC	BBLE DAIN	KEL V	AMP LE	***************************************											

,	SUMA	AARY OI	F LABOF	PATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRC	PROJECT	3	IE: COH WC	ater Line Re	placeme	2.	Kickerillo	Area	
AND		CEOTE	CEOTEST ENCINEERING,	SINE	ERING, INC.			PRC	PROJECT	- 1	Houstor BER: 1140	Houston, Texas NUMBER: 1140194601) })			
		SA	SAMPLE					ΠΑ I	ATTERBERG LIMITS	RG		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
0		De (1	Depth (ft.)			WATER	DRY	<u> </u>	ā	i	PASSING NO. 200	Shear	Shear		Shear	Shear	
NO.	No.	Тор	Bottom	Туре	SPI (blows/ft.)	CONIENI (%)	DENSILY (pcf)		式	<u> </u>	SiEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-13	2	9.0	2.0	Ωn		20									0.50	0.25	FII
	ъ	2.0	4.0	an		27									0.40	0.25	FILE
	4	4.0	6.0	GN		19									0.50	0:50	FIE
	2	6.0	8.0	gn		30	100	54	22	32	93		0.95	0.58	1.25	2.00	Fat Cloy
	ပ	8.0	10.0	9		25									2.00	2.13	Fat Clay
	7	10.0	11.0	an											1.00	2.00	Lean Clay
	80	11.0	12.0	Ωn		22									1.00	1.75	Lean Clay
	6	12.0	14.0	an		21	107	29	20	თ	95		0.75	1.01		1.00	Lean Clay
	0	14.0	16.0	an		22									09:0	0.75	Lean Clay
	Ξ	16.0	17.0	an		14									09:0	2.25	Lean Clay
						:											
LEGEND:	SS AG	SPLIT SI AUGER (PITCHER	JRBED SAN POON SAN SUTTINGS BARREL BAR	APLE, IPLE SAMPLI	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS BITCHER BARREL SAMPLE NA-DOUIRRIF BARBEL SAMPLE	FIELD		SP. T. J. J. F.	Sto Liqu	andard uid Lin Istic Li sticity	= Standard Penetration Test = Liquid Limit = Plastic Limit : Plasticity Index	Test					
			ייעם אחםם	אבר	AMFLE										***************************************	-	

	SUMM	IARY OF	F LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC	ter Line Re	olaceme	nt in K	in Kickerillo Area	Area	
	Permanent Automobile	CEOTEST		NNEE	ENCINEERINC, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601		า			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	<u>گ</u>		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE – TROMETER	
o Circ		De (†	Depth (ft.)			WATER	DRY	l	i		PASSING NO. 200		Shear	Canf.		Shear	
NO.	Na.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	Ⅎ	۲	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-14	2	0.7	2.0	an		21									0.50	0.75	Lean Clay
	3	2.0	4.0	an		19									0.50	0.75	Lean Clay
	4	4.0	6.0	g		82	112	43	16	27	71		0.67	0.43	1.00	1.25	Lean Clay
	2	6.0	8.0	9		17									1.00	1.38	Lean Clay
	9	8.0	10.0	Ωn		20									0.40	0.38	Lean Clay
***************************************	7	10.0	12.0	gn		19											Clayey Silt
	80	12.0	14.0	an		23	96	28	19	6			0.40	1.01	0.50	0.88	Leon Clay
	6	14.0	16.0	g		23		57	23	34	100				2.00	2.13	Fat Clay
	10	16.0	17.0	an		24									2.00	2.25	Fat Clay
The second secon																	
LEGEND:	SS AG	UNDISTU SPLIT SF AUGER C PITCHER	JRBED SAW POON SAMI CUTTINGS BARREL S	PLE, E	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS PICHER BARREL SAMPLE NX-DOUIBRIF RARPEL SAMPLE	FIELD		SP.T. I	Star Star Liqu	ndord Jid Lim stic Lir sticity l	Standord Penetration Test Liquid Limit Plastic Limit Plasticity Index	Fest					
		200	מטרר טייי	VEL JA	MPLC								***************************************	***************************************			

	SUMN	IARY O	F LABOF	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		COH WC	ter Line Re	placeme -0185_	ri in X	ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	CINE	SRING, INC.			PRO	PROJECT	NUME	Houston 3ER: 1140	Houston, Texas NUMBER: 1140194601)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
BORING	:	De (1	Depth (ft.)	1	SPT	WATER	DRY DENSITY	1	김	_ =	PASSING NO. 200 SIEVE	Shear Strength	Shear Strength	Conf. Press.	Shear Strength	Shear	
NO.	o N	Тор	Bottom	Туре	(blows/ft.)	(%)	(bct)	- 1			(%)	(tsť)	(tsf)	(tsf)	(tsf)	(tsf)	TYPE OF MATERIAL
CB-15	2	0.5	2.0	gn		16									1.63	1.88	Lean Clay
	٣	2.0	4.0	an		14									1.63	2.13	Leon Clay
	4	4.0	9.0	gn .		23									1.25	1.50	Fat Clay
	S	6.0	8.0	gn		20									1.13	2.25	Fat Clay
	9	8.0	10.0	9		26	104	20	21	29	92		0.93	0.72	1.38	1.25	Fot Clay
	7	10.0	12.0	g,		23									1.00	2.13	Fat Clay
	80	12.0	14.0	an		20									1.13	1.00	Fat Clay
															-		
			:														
																A CONTRACTOR OF THE CONTRACTOR	
LEGEND:	SSS X X BB X	SPLIT SF AUGER C PITCHER Nx-DOUL	 UNDISTURBED SAMPLE, EXTRUDI SPLIT SPOON SAMPLE AUGER CUTINGS PITCHER BARREL SAMPLE NX-DOUBBLE BARREL SAMPLE 	APLE, I PLE SAMPLE REL SA	0: N	FIELD		SPT	= Ston = Liqui = Plos = Plost	dord Fid Limi	Standord Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
							+										

	SUMM	IARY OI	F LABOF	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAME:	COH Wa	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	-0185-	nt to	ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	TINEE	RING, INC.	_		PRO	PROJECT	NUMBE	Houston, ER: 11401	Texas 94601					
		SA	SAMPLE					ATTA	ATTERBERG LIMITS	U		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
0		De C.	Depth (ft.)			WATER		1		Τ	PASSING NO. 200		Shear	1	1	Shear	
NO.	8	Тор	Bottom	Туре	SPT (blows/ft.)	CONTENT (%)	DENSITY (pcf)	=	<u>ਦ</u>	<u> </u>	Sieve (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-16	2	0.7	2.0	an		20									0.45	0.88	Lean Clay
	3	2.0	4.0	9		17									0.65	0.50	Leon Clay
	4	4.0	6.0	g		20									0.65	0.88	Lean Clay
	2	6.0	8.0	9		20	111	46	20 2	26	73		0.73	0.58	1.13	1.13	Lean Clay
	9	8.0	10.0	g		21									1.00	0.50	Lean Clay
	7	10.0	12.0	g		20									0.55	0.38	Lean Clay
	8	12.0	14.0	an		19									0.50	0.38	Lean Clay
						:											
LEGEND:	SSS ×		JRBED SAN POON SAM UTTINGS BARREL (APLE, E PLE SAMPLE REL SA	UNDISTURBED SAMPLE, EXTRUDED IN FIELD SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE NX—DOUBBLE BARREL SAMPLE	TELD		SPT	= Stonc = Liquic = Plost = Plosti	dard Pe d Limit tic Limit icity Ind	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	st					
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	SUMA	MARY 0]	F LABOF	RATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAME:	COH WG WBS No.	ter Line Rel S-000035	placemei -0185-	tr 3 3	ickerillo .	Area	
		CEOTEST		CINE	ENGINEERING, INC.			PRO	PROJECT	NUMBE	Houston, ER: 11401	Houston, Texas NUMBER: 1140194601)	1			
		SAI	SAMPLE					ATTA	ATTERBERG LIMITS	U		UNCONFINED COMPRESSION TEST	TRIAXIAL COMPRESSION TEST (U-U)	(IAL SSION (U-U)	TORVANE	POCKET PENE - TROMETER	
CNIGOR		De	Depth (ft.)			WATER		1	ā	Γ	PASSING NO. 200		Shear		1	Shear	
NO.	No.	Тор	Bottom	Туре	(blows/ft.)	CONIEN (%)	(pcf)	∃		<u> </u>	%) %) %	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-17	2	0.5	2.0	9		19									0.88	0.75	Lean Clay
	٣	2.0	4.0	9		18									1.00	0.75	Lean Clay
	4	4.0	6.0	9		18									0.25	0.88	Lean Clay
	5	6.0	8.0	9		23									0.63	1.00	Lean Clay
	9	8.0	10.0	9		21	107	47	50	27	86		1.65	0.72	1.63	1.38	Lean Clay
	7	10.0	12.0	2	TO COLUMN TO THE PARTY OF THE P	21									1.25	1.13	Lean Clay
	œ	12.0	14.0	an		23									1.00	1.88	Lean Clay
LEGEND:	SSS SS SB SS S	SPLIT SI SPLIT SI AUGER (= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = Nx-DOUBBLE BARREL SAMPLE	MPLE, MPLE SAMPLI REL SV	S C	FIELD		SPT	= Stan = Liqui = Plost = Plost	idard Pe id Limit tic Limit icity Ind	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
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	SUMIN	[ARY 0]	F LABOF	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT NAME:	NAME	COH WG	ter Line Reg S-000035	olaceme -0185-	nt in K	ickerillo	Area	
		GEOTE	GEOTEST ENGINEERING,	SINE	SRING, INC.			PRO	PROJECT	NUMB	Houston 3ER: 1140	Houston, Texas NUMBER: 1140194601))			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	9		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		De (Depth (ft.)			WATER		i		1	PASSING NO. 200		Shear	Conf.	1	Shear	
NO.	Š.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	∃		<u></u>	SiEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-18	2	9.0	2.0	S		17									1.00	1.25	Lean Clay
	ю	2.0	4.0	an		17									1.13	1.25	Leon Clay
	4	4.0	6.0	an	19	19									1.38	1.13	Leon Clay
	2	6.0	8.0	Gn .		23									1.00	1.13	Lean Clay
	9	8.0	10.0	9		19	107	45	19	26	79		0.63	0.72	1.00	0.50	Lean Clay
	7	10.0	12.0	gn		81									1.25	1.38	Lean Clay
	ω	12.0	14.0	9		18					·				0.65	0.75	Lean Clay
	б	14.5	16.0	SS	19	26					72						Silt
	10	16.0	17.0	OD		27									1.13	2.00	Fat Clay
									-								
						7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7				 							
											The same of the sa	MONTH AND STATE OF THE PERSON					
LEGEND:	SS SS XX	SPLIT SE AUGER (PITCHER Nx-DOLIS	= UNDISTURBED SAMPLE, EXTRUDI SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE NX—DOJIRRI F RARREL SAMPLE	APLE, E	EXTRUDED IN FIELD E. E. SAMPLE	TELD		ST TE	= Stan = Liqui = Plast = Plast	idard P id Limit tic Lim icity In	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
	1			1													

	SUMA	AARY OI	F LABOR	PATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRC	PROJECT		COH Wa	ter Line Re S-000035	placeme -0185-	<u>.</u> ⊆	Kickerillo	Area	
		CEOTE	GEOTEST ENGINEERING,	FINE	SRING, INC.			PRC	PROJECT	NUM	Houston BER: 1140	Houston, Texas NUMBER: 1140194601)))			
		SS	SAMPLE					Æ	ATTERBERG LIMITS	ပ္က		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
0 2 2 3		De (Depth (ft.)			WATER	DRY	1	ā		PASSING NO. 200		Shear	Conf.	Shear	Shear	
NO.	No.	Тор	Bottom	Туре	SPI (blows/ft.)	CONIEN (%)	(pcf)	<u> </u>	로	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-19	2	0.4	2.0	an		19									0.75	1.00	Sandy Leon Cloy
	3	2.0	4.0	g		18									1.00	1.00	Sandy Leon Clay
	4	4.0	6.0	9		18									1.00	1.00	Sandy Lean Clay
	3	6.0	8.0	9		19									0.88	0.88	Sandy Lean Clay
	9	8.0	10.0	9		17	111	42	16	26	62		0.61	0.72	1.00	1.13	Sandy Lean Clay
	7	10.0	12.0	95		17									1.00	1.38	Sandy Lean Clay
	8	12.0	14.0	gn		16									1.13	1.63	Sandy Lean Cloy
				~~~													
													***************************************				
													**************************************				
LEGEND:	SSS N N N N N N N N N N N N N N N N N N	SPLIT SI AUGER ( PITCHER Nx-DOUI	JRBED SAN POON SAM JUTTINGS BARREL ( BBLE BARF	APLE, I IPLE SAMPLE REL SA	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS TICHER BARREL SAMPLE Nx-DOUBBLE BARREL SAMPLE	FIELD		A 기 시 시	Stor Liquida Plos	ndard   iid Limi stic Lin ticity Ir	Standord Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
						-	-										

	SUMM	ARY OF	LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		COH WG	ter Line Re . S-000035	placeme -0185-	int in k	(ickerillo	Area	
		CEOTE	CEOTEST ENGINEERING,	NEE	FRING, INC.			PRO	PROJECT	NUMB	Houston ER: 1140	Houston, Texas NUMBER: 1140194601		1			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ပ		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE – TROMETER	
C		Depth (ft.)	oth t.)			WATER	DRY	İ		T	PASSING NO. 200	1	Shear		Shear	Shear	
BOKING NO.	S S	Тор	Bottom	Туре	SPT (blows/ft.)	CONTENT (%)	DENSITY (pcf)			<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-20	2	0.8	2.0	an		14									2.00	2.25	Lean Clay
	3	2.0	4.0	an		12									1.88	2.25	Lean Clay
	4	4.0	6.0	an		16									1.50	1.75	Lean Clay
	2	6.0	8.0	gn .		19	108	51	17	34	83		0.66	0.58	09:0	0.63	Fat Clay
	9	8.0	10.0	an		20									0.63	1.00	Fat Clay
	7	10.0	12.0	gn		18									0.40	0.63	Sandy Lean Clay
	80	12.0	13.0	an		19									0.40	0.88	Sandy Lean Clay
					1.51-5-1-5-												
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LEGEND:	SS SS AS  UNDISTU SPLIT SF AUGER C PITCHER	RBED SAN DOON SAM UTTINGS BARREL S	APLE, E	UNDISTURBED SAMPLE, EXTRUDED IN FIELD SPLIT SPOON SAMPLE. AUGER CUTTINGS PITCHER BARREL SAMPLE N×-DOINRY F PARREL	TELD		R T T T T T T T T T T T T T T T T T T T	= Ston = Liquid = Plost = Plost	idard P id Limit tic Limit icity Inc	Standord Penetration Test Liquid Limit Plostic Limit Plosticity Index	est						
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	SUMA	IARY OF	LABOR	'ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	E: COH WC WBS No	ater Line Re	placeme -0185-	nt in 4 3	in Kickerillo Area	Area	
		CEOTE	CEOTEST ENCINEERING,	FINE	RING, INC.			PRO	PROJECT	NOM	Houstor BER: 1140	Houston, Texas NUMBER: 1140194601		1			
		SAR	SAMPLE					ATT	ATTERBERG LIMITS	ပ္င		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
ONGO		De (†	Depth (ft.)			WATER	DRY	ļ	ā	i	PASSING NO. 200	Shear	Shear	Conf.	Shear	Shear	
NO.	Š	Тор	Bottom	Туре	(blows/ft.)	CONIEN (%)	(pcf)	3	<u> </u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-21	2	9.0	2.0	an		16									1.13	1.13	Lean Cloy
	8	2.0	4.0	an		16					AL STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE ST				1.00	1.38	Lean Cloy
	4	4.0	6.0	an		17									1.00	1.38	Lean Clay
	5	6.0	8.0	gn		21									0.75	1.00	Fat Clay
	9	8.0	10.0	9		20	108	52	21	31	76		0.70	0.72	0.75	1.00	Fat Clay
	7	10.0	12.0	g		18	areas and a second								0.38	1.00	Sandy Lean Clay
	80	12.0	13.0	9		21									0.30	0.63	Sandy Lean Clay
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									<b></b>								
LEGEND:	SSS AK	SPLIT SF AUGER C PITCHER NX-DOUF	RBED SAN POON SAM UTTINGS BARREL S	APLE, E PLE SAMPLE SFI SA	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS PITCHER BARREL SAMPLE Nx—DOUBBIF BARREI SAMPLE	FIELD		SPL PPL "	= Star = Liqu = Plas	ndard iid Lim stic Lir iticity II	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	Test					
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	SUMN	TARY OF	- LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		COH WC	iter Line Re	placeme		in Kickerillo Area	Area	
		CEOTEST		KINE	ENGINEERING, INC.			PRO	PROJECT	NUME	Houston BER: 1140	Houston, Texas NUMBER: 1140194601	2	า			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE— TROMETER	
CINICO		De (†	Depth (ft.)			WATER	DRY	i .	ā	i	PASSING NO. 200	Shear	Shear	Conf.	Shear	Shear	
NO.	No.	Тор	Bottam	Туре	SPI (blows/ft.)	CONIENI (%)	DENSITY (pcf)	∃			SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
C8-22 (C8-22P)	2	0.8	2.0	an		19									0.63	0.63	Lean Clay
	3	2.0	4.0	GD.		11									0.40	0.63	Lean Clay
	4	4.0	6.0	9		17	111	30	15	15	80		0.35	0.43	0:20	0.38	Lean Clay
	5	6.0	8.0	9		18									0.75	1.00	Lean Clay
	9	8.0	10.0	9		17									0.45	0.88	Lean Clay
	7	10.0	12.0	ŝ		23									0.45	0.88	Lean Clay
	ω	12.0	14.0	S		24	102	59	17	12	66		0.45	1.01	0.40	0.88	Lean Clay
	6	14.0	16.0	9		25									1.75	2.25	Fot Clay
	10	16.0	17.0	9		26		59	23	36	100				2.25	2.25	Fat Clay
	-	17.0	18.0	an												2.25	Fot Clay
										*********							
LEGEND:	SSS AG NEW NX NX NX NX NX NX NX NX NX NX NX NX NX	SPLIT SF AUGER C PITCHER Nx-DOU!	<ul> <li>UNDISTURBED SAMPLE, EXTRUDI</li> <li>SPLIT SPOON SAMPLE</li> <li>AUGER CUTTINGS</li> <li>PITCHER BARREL SAMPLE</li> <li>NX-DOUBBLE BARREL SAMPLE</li> </ul>	APLE,   PLE SAMPLE REL SA	ED	FIELD		SPT	= Stor = Liqu = Plas	ndard   lid Lim stic Lin	Stondord Penetration Test Liquid Limit Plastic Limit Plasticity Index	lest					
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	SUMM	IARY OF	7 LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH WG	ter Line Re S-000035	placeme -0185-	ri X	in Kickerillo Area	Area	
		GEOTEST	ST ENC	;INEE	ENGINEERING, INC.		***************************************	PRO.	PROJECT	NUMB	Houston ER: 1140	Houston, Texas NUMBER: 1140194601	5	)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ပ္		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
BORING		) O	Depth (ft.)			WATER	DRY	ı	ā	T	PASSING NO. 200		Shear	1	1	Shear	
NO.	Š	Тор	Bottom	Туре	(blows/ft.)	(%)	(pcf)		٦ 	ī.	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-23	2	0.5	2.0	gn		17									1.00	0.88	Lean Clay
	ъ	2.0	4.0	On .		18									1.00	1.75	Leon Clay
	4	4.0	6.0	g,		15									1.00	2.25	Lean Clay
	5	6.0	8.0	On .		23	105	67	25	42	88		1.99	0.58	1.13	1.25	Fat Clay
	9	8.0	10.0	g,		23									1.25	1.88	Fat Clay
THE REAL PROPERTY AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON	7	10.0	12.0	9		26		99	25	41	66				2.50	2.25	Fat Clay
	æ	12.0	13.0	an		22									2.50	2.25	Fat Clay
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					the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the fair and the f												
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LEGEND:	SSS X X BB	UNDISTU SPLIT SF AUGER C PITCHER Nx-DOUE	<ul> <li>UNDISTURBED SAMPLE, EXTRUDE</li> <li>SPLIT SPOON SAMPLE</li> <li>AUGER CUTINGS</li> <li>PITCHER BARREL SAMPLE</li> <li>NX-DOUBBLE BARREL SAMPLE</li> </ul>	APLE, E PLE SAMPLE REL SA	EXTRUDED IN FIELD  E  AMPLE	IELO		SPT	= Star = Liqui = Plas = Plast	id Limit tic Limit ticity In	Standord Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
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_	SUMIN	(ARY O	F LABOF	RATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	i .	E: COH Wc WBS No	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	placeme -0185-	nt in k	ickerillo	Area	
		CEOTEST	ST EN	CINE	ENGINEERING, INC.			PRO	PROJECT		Houstor BER: 1140	n, Texas 194601		ı			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	25		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
BORING		De C	Depth (ft.)			WATER	DRY	=	ā	ã	PASSING NO. 200	Shear	Shear	Conf.	1	Shear	
NO.	Š	Тор	Bottom	Туре	(blows/ft.)	(%) (%)	(pcf)		7	Σ	SIEVE (%)	strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-24	2	9.0	2.0	9		18									1.50	1,63	Sandy Lean Clay
	3	2.0	4.0	S		15									1.50	1.75	Sandy Lean Clay
	4	4.0	6.0	S		17	112	41	17	24	70		1.13	0.43	1.25	1.25	Sandy Lean Clay
	S.	6.0	8.0	an		17									08.0	0.88	Sandy Lean Clay
	9	8.0	10.0	gn		23									1.50	1.50	Fat Clay
	7	10.0	12.0	g		33	88	57	23	34	93		0.33	0.86	09:0	0.75	Fat Clay
	ω	12.0	14.0	an		22									2.00	2.25	Fat Clay
		_															
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LEGEND:	SS SS S	UNDISTL SPLIT SF AUGER ( PITCHER	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = NU-CHORD F SARDEL	MPLE, IPLE SAMPLI	EXTRUDED IN FIELD	FIELD		SPT PP PF FF	Star Elique Plas	ndard Jid Lim Stic Lir ticity h	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	[est					
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	SUMM	IARY OF	LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	E: COH WC WBS No	ter Line Re	placeme -0185-	Ŀ.	Kickerillo	Area	
		CEOTEST	ST ENC	ZINE	ENGINEERING, INC.			PRO	PROJECT	- 1	Houston BER: 1140	Houston, Texas NUMBER: 1140194601	) -	)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	35		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
S S S S S S S S S S S S S S S S S S S		Del (†	Depth (ft.)			WATER	DRY		ā	č	PASSING NO. 200	Shear	Shear	Canf.		Shear	-
NO.	So.	Тар	Bottom	Туре	(blows/ft.)	(%)	(pcf)		7	<u> </u>	Sieve (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-25	2	9.0	2.0	g,		17									1.00	1.00	Lean Clay
	5	2.0	4.0	<u>a</u>		14									2.00	2.13	Lean Clay
	4	4.0	6.0	9		15									2.00	1.75	Lean Clay
	5	6.0	8.0	<u>a</u>		21	105	65	25	40	86		1.04	0.58	1.25	1.25	Fot Clay
	9	8.0	10.0	9		22									1.00	1.00	Fat Clay
	7	10.0	12.0	an		29		69	26	43	96				1.50	1.50	Fat Clay
	∞	12.0	14.0	ΩΩ		21									2.00	2.25	Fat Clay
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LEGEND:	SS AG AG AG AG AG AG AG AG AG AG AG AG AG	SPLIT SF AUGER C PITCHER	IRBED SAN 200N SAM 20TINGS BARREL SARIE	APLE,   PLE SAMPL(	UNDISTURBED SAMPLE, EXTRUDED IN FI SPLIT SPOON SAMPLE AUGER CUTINGS RICHER BARREL SAMPLE NY-DOLIBRIF RAPPEL SAMPLE	FIELD		SP TPF	Sto Liqu	indard Jid Lim Stic Lii sticity I	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	lest					
				1 .	TANI CE				-								

	SUMI	IARY OI	F LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT NAME:	NAME	COH Wa WBS No.	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	placeme -0185-	3 in F	(ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	SINEE	ERING, INC.	_		PRO	PROJECT	NUMB	Houston, ER: 11401	Texas 94601					
·		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ري ري		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
G		De (1	Depth (ft.)			WATER		1	i	Τ	PASSING NO. 200		Shear	Conf.	Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	SPI (blows/ft.)	CONIENI (%)	DENSITY (pcf)	<b>=</b>		<u>~</u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-26	2	9.0	2.0	9		14									1.50	2.25	Lean Clay
	3	2.0	4.0	an		14									2.00	2.25	Leon Clay
	4	4.0	6.0	9		16									1.50	1.88	Lean Clay
	3	6.0	8.0	G		16									1.88	1.88	Lean Clay
	9	8.0	10.0	an		16	115	45	19	26	80		1.85	0.72	1.50	1.88	Lean Clay
	7	10.0	12.0	9		16				-					1.38	1.25	Lean Clay
	80	12.0	13.0	an		17									1.00	1.50	Leon Clay
													***************************************				AND ENGINEERING CONTRACTOR OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF
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LEGEND:	SS SS N NX PB R II II	SPLIT SF AUGER ( PITCHER Nx-DOUI	JRBED SAN JOON SAM JUTTINGS BARREL ( BBRREL (	APLE, EPLE	UNDISTURBED SAMPLE, EXTRUDED IN FIELD SPLIT SPOON SAMPLE. AUGER CUTTINGS PITCHER BARREL SAMPLE. NX—DOUBBLE BARREL SAMPLE.	TELD		SPT	= Stanc = Liquic = Plast = Plast	dard P d Limit tic Limi icity Inc	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	tse					
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	SUMN	fary of	LABOF	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRC	PROJECT		E: COH WC WBS No	ter Line Re . S-000035	placeme	nt in K	ickerillo	Area	
		GEOTE	ST EN	SINE	GEOTEST ENGINEERING, INC.			PRC	PROJECT		Houstor BER: 1140	Houston, Texas NUMBER: 1140194601	) -	,			
		SAN	SAMPLE					TA	ATTERBERG LIMITS	25		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		De (	Depth (ft.)			WATER	DRY		ā	i	PASSING NO. 200	Shear	Shear	Conf.	Sheor	Shear	
NO.	No.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	∃	<b>പ</b>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-27	2	0.5	2.0	an		19									0.75	1.00	Lean Clay
	3	2.0	4.0	an		14									1.50	2.00	Lean Clay
	4	4.0	6.0	an		16									1.63	2.00	Lean Clay
	ഹ	6.0	8.0	S		19									0.75	1.00	Lean Clay
	9	8.0	10.0	9		21	106	49	21	28	88		0.86	0.72	0.70	0.88	Lean Clay
	7	10.0	12.0	gn		18									1.00	1.25	Lean Clay
	ω	12.0	13.0	an		20									0.75	0.88	Lean Clay
LEGEND:	SS SS AS		JRBED SAM POON SAM UTTINGS BARREL BARIE	APLE, I IPLE SAMPLE	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS BITCHER BARREL SAMPLE NA-DOUIRRIF RARPER SAMPLE	FIELD		SPT	Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storing Storin	ndard Jid Lim Stic Lir Iticity I	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	lest					
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	SUMM	IARY OF	' LABOR	'ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH WC	ter Line Re . S-000035	placeme -0185-	.⊑	Kickerillo ,	Area	
		CEOTE	CEOTEST ENCINEERING,	TINEE	RING, INC.			PRO	PROJECT	NUME	Houstor 3ER: 1140	Houston, Texas NUMBER: 1140194601		1			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
o N		) O	Depth (ft.)			WATER	DRY	<u> </u>	ã	ā	PASSING NO. 200	Shear	";	Conf.		Shear	
NO.	Na.	Тор	Bottom	Туре	(blows/ft.)	CONIEN (%)	(pcf)	∃	ᅺ		SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-28	2	0.5	2.0	gn		13									0.63	1.00	Lean Clay
	3	2.0	4.0	gn		18					CALL DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLEGE DE LA COLLE				1.00	0.88	Lean Clay
	4	4.0	6.0	an		16									1.00	1,13	Lean Clay
	S.	6.0	8.0	gn .		16									1.00	1.13	Lean Clay
	9	8.0	10.0	an		20	110	49	20	29	76		0.57	0.72	0.75	1.13	Lean Clay
	7	10.0	12.0	gn		19									0.88	1.25	Leon Clay
A PATRICIA DE CAMPANA PARA PARA PARA PARA PARA PARA PARA	α0	12.0	14.0	an		18									0.88	1.25	Lean Clay
											The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa						
LEGEND:	UD SS AG NY NY NY		IRBED SAN DOON SAM UTTINGS BARREL SADE	APLE, E PLE SAMPLE	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS TICHER BARREL SAMPLE NY-DOI IRRIF E ARPER! SAMPLE	FIELD		SP 19	= Star = Liqu = Plas	ndard Fid Limi	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	Fest					
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	SUMN	(ARY OF	F LABOF	RATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRC	PROJECT		IE: COH WC	ter Line Re . S-000035	placeme -0185-	3 in K	Gickerillo	Area	
		CEOTEST	SST EN	SINE	ENGINEERING, INC.			PRC	PROJECT		Houston (BER: 1140	Houston, Texas NUMBER: 1140194601	)	)			
		SAN	SAMPLE					FA .	ATTERBERG LIMITS	RG		UNCONFINED COMPRESSION TEST	1	TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
2		De ((	Depth (ft.)			WATER	DRY		i		PASSING NO. 200		Shear	Conf.		Shear	
BORING NO.	Š.	Тор	Bottom	Туре	(blows/ft.)	CONTENT	DENSITY (pcf)		<u> </u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-29	2	1.3	2.0	an		17									0.88	1.38	Sandy Clay
	٣	2.0	4.0	an		17									1.00	1.13	Sandy Clay
	4	4.0	6.0	an		16									1.25	1.63	Sandy Clay
	S	6.0	8.0	<u>O</u> n		18	116	46	20	26	99		0.65	0.58	0.88	1.25	Sandy Clay
	9	8.0	10.0	S		18									1.25	1.50	Sandy Clay
	7	10.0	12.0	an		16									1.25	1.75	Sandy Clay
	ω	12.0	14.0	an		17									1.00	1.50	Sandy Cloy
	6	14.0	16.0	an		16	116	35	16	19	68		0.73	1.15	0.75	0.75	Sandy Clay
	5	16.0	18.0	an		17									0:20	1.00	Sandy Clay
	-	18.0	20.0	an		15									0:20	1.13	Sandy Clay
LEGEND;	SSS X N BBG X	SPLIT SF AUGER C PITCHER Nx-DOUI	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = Nx—DOUBBLE BARREL SAMPLE	APLE,   IPLE SAMPLE REL SA	E N	FIELD		SPT PPL "	= Sto = Liqu = Pio = Plos	andard uid Lin sstic Li sticity	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
	1									-				-			

	SUMA	IARY OF	7 LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		COH WG	ter Line Rev . S-000035	olaceme -0185-	nt in K	ickerillo	Area	
		GEOTE	GEOTEST ENGINEERING,	INEE	RING, INC.			PRO	PROJECT	NUME	Houston 3ER: 1140	Houston, Texas NUMBER: 1140194601		1			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE— TROMETER	
0		De (†	Depth (ft.)		***************************************	WATER	DRY	1	i		PASSING NO. 200		Shear		1	Shear	
NO.	No.	Тар	Bottom	Туре	(blows/ft.)	CONTENT (%)	DENSITY (pcf)	∃	<b>ਜ</b>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-30	2	**0	2.0	an		15									2.25	2.25	Lean Clay
	3	2.0	4.0	gn		14									2.25	2.25	Lean Clay
	4	4.0	6.0	an		15									2.00	2.25	Lean Clay
	5	6.0	8.0	an		16									2.00	2.25	Lean Clay
	9	8.0	10.0	an		17									1.75	2.25	Lean Clay
	7	10.0	11.0	g		18									1.13	1.25	Lean Clay
	80	11.0	13.0	Ωn		18	109	43	19	24	75		0.76	0.94	1.00	0.88	Lean Clay
	6	13.0	15.0	an		17									1.00	1.25	Lean Clay
												TOTAL PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY					
T. Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Con																	
LEGEND:	SSS AS	SPLIT SF SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = NUTCHER BARREL SAMPLE = NUTCHER BARREL SAMPLE	PLE, E	EXTRUDED IN FIELD	7IELD		R 14 4	= Star = Liqui = Plas = Plast	ndard F lid Limi stic Lirr ticity In	Standord Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
	1 1	14X - CCC	מטרב מאייו	YEL ON	MPLE							***************************************					

	SUMIN	TARY OF	LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH WG	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3	placeme -0185-	nt in K	ickerillo	Area	
		CEOTE	ST ENC	SINE	GEOTEST ENGINEERING, INC.			PRO	PROJECT	NUME	Houston 3ER: 1140	, Texas 194601	)	)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည္က		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		De (±	Depth (ft.)			WATER	DRY		ā	i	PASSING NO. 200		Shear	Conf.		Shear	
NO.	Š.	Тор	Bottom	Туре	SP1 (blows/ft.)	CONTENT (%)	(pcf)		式	ī	SEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-31	2	0.5	2.0	an		16									1.13	1.50	Lean Clay
	3	2.0	4.0	an		17		48	6	29	82				1.13	1.50	Leon Clay
	4	4.0	6.0	9		16									1.13	1.50	Sandy Lean Clay
	2	6.0	8.0	9		17									0.88	1.38	Sandy Lean Clay
	9	8.0	10.0	9		16									0.63	1.25	Sandy Lean Clay
	7	10.0	12.0	g		18	111	30	16	14	99		0.41	0.86	0.40	0.88	Sandy Lean Clay
	80	12.0	13.0	9		18									0.63	0.88	Sandy Lean Clay
	6	13.0	15.0	OD		18									0.50	1.00	Sandy Lean Clay
												**************************************					
LEGEND:	SSS X N B B R II II II II II II II II II II II II I	SPLIT SF AUGER C PITCHER Nx-DOUE	= UNDISTURBED SAMPLE, EXTRUDI SPLIT SPOON SAMPLE A AUGER CUTTINGS PITCHER BARREL SAMPLE • Nx—DOUBBLE BARREL SAMPLE	APLE, E PLE SAMPLE REL SA	EXTRUDED IN FIELD. E. AMPLE	TELD		SPT	= Star = Liqu = Plas = Plas	ndord I iid Lim stic Lin ticity Ir	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
-	1	***************************************										***************************************					

	SUMM	(ARY OF	ה LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC	ter Line Re	placeme	ء.	Kickerillo Area	Area	
		GEOTEST		;INEE	ENGINEERING, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601		ז			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	35		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
0		De (f	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200	Shear	Shear	Conf.	Shear	Shear	
NO.	Š	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	∃	۲	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-32	2	9.0	2.0	an		19									1.38	1.75	Lean Clay
	3	2.0	4.0	9		14									1.38	1.88	Lean Clay
	4	4.0	6.0	ΩŊ		14	117	34	17	17	82		1.52	0.43	1.13	1.75	Lean Clay
	S	6.0	8.0	Ωn		13		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							0.50	1.25	Lean Clay
	9	8.0	10.0	9		14									0.38	1.38	Lean Clay
	7	10.5	12.0	SS	16	1					50						Sandy Silt
	8	12.0	14.0	9		17	117	41	16	25	80		1.42	1.01	1.25	1.38	Lean Clay
	6	14.0	16.0	9		15	·								0.88	1.63	Lean Clay
	10	16.0	18.0	an		16									1.38	2.00	Lean Clay
											The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s					-	
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LEGEND:	SSS AS	UNDISTU SPLIT SF AUGER C PITCHER	UNDISTURBED SAMPLE, EXTRUDED SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE NA-DOIRRIF ARREST SAMPLE	PLE, E	<u>z</u>	FIELD		SPT PP	Star   Ciqu	ndard I lid Limi stic Lin	Standard Penetratian Test Liquid Limit Plastic Limit Plasticity Index	est					
	1	NA LOCK	מטרב טיייי	AEL JA	MITLE			***************************************	***************************************	***************************************		**************************************					

	SUMM	IARY OF	- LABOF	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAME	COH WG	NAME: COH Water Line Replacement in Kickerillo Area WBS No. S—000035—0185—3	placeme -0185-	nt in K	ickerillo	Area	
The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s		CEOTE	ST EN	SINE	CEOTEST ENGINEERING, INC.			PRO	PROJECT	NUME	Houston 3ER: 1140	, Texas 194601					
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (UU)	TORVANE	POCKET PENE— TROMETER	
C		De (f	Depth (ft.)			WATER	DRY	ł	i		PASSING NO. 200		Sheor	Conf.	Shear	Shear	
NO.	No.	Тор	Battom	Туре	SPT (blows/ft.)	CONTENT (%)	DENSITY (pcf)	<u> </u>	굽	<u></u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-33	2	0.5	2.0	On .		19									1.00	1.00	Fat Clay
	ъ	2.0	4.0	9		18									1.13	1.25	Fot Clay
	4	4.0	6.0	gn		19									0.88	1.25	Sondy Leon Clay
	2	6.0	8.0	9		18									0.88	1.13	Sandy Lean Clay
	9	8.0	10.0	g		14	116	31	15	16	99		0.85	0.72	0:50	1.13	Sandy Leon Cloy
	7	10.0	12.0	S		17									0:20	0.88	Sandy Lean Clay
	80	12.0	14.0	S		16									0.35	0.88	Sandy Lean Clay
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,																	
			-														
LEGEND:	SS SA X	UNDISTU SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDI SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE NY-DOJIRRI F RARREL SAMPLE	APLE, I PLE SAMPLE	O:	FIELD		유그목모	= Stan = Liqui = Plas = Plast	ndord Finding Limi	Standord Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
	ì				7		-										

	SUMM	(ARY OF	F LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC	ter Line Re	olaceme	nt in K	ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	INE	ERING, INC.			PRO	PROJECT		Houstor BER: 1140	Houston, Texas NUMBER: 1140194601	)	)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	35	TOTAL DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES DE LA CALLES	UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	And the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s
Q Q		De (f	Depth (ft.)			WATER	DRY	1	i		PASSING NO. 200		Sheor	Conf.	Shear	Shear	
BORING NO.	No.	Тор	Bottom	Туре	SPT (blows/ft.)	CONTENT (%)	DENSITY (pcf)	<b>=</b>	<u>ح</u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-34	2	0.5	2.0	۵n		12					Activities in the				1.13	2.25	Lean Clay
	3	2.0	4.0	gn		11									2.00	2.25	Lean Clay
	4	4.0	6.0	gn		12									2.13	2.25	Lean Clay
	5	6.0	8.0	an		14									2.00	2.25	Lean Clay
	_Q	8.0	10.0	g		16									1.88	2.00	Lean Clay
	7	10.0	12.0	gn		17	117	42	18	24	71		0.93	0.86	0.88	1.38	Lean Clay
	80	12.0	13.0	gn		19									0.75	0.88	Lean Clay
	6	13.0	15.0	an		19									0.45	0.63	Lean Clay
				_													
LEGEND:	SS AG SS AG S	UNDISTU SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE = NUTCHER BARREL SAMPLE = NUTCHER BARREL SAMPLE	APLE, E	ED	FIELD		SP 19 F	Stor E Lique Plos	ndord Jid Lim stic Lir sticity L	= Standard Penetration Test = Liquid Limit = Plastic Limit : Plasticity Index	lest					
	1	NA 1000	מטרב טאיי	7   F	WIT LE												

SUMMARY OF LABORATORY TEST RESULTS  WES No. S-000035-0185-3  Houston, Texas  PROJECT NUMBER: 1140194601	LE ATTERBERG UNCONFINED TRIAXIAL POCKET COMPRESSION TORVANE PENE— LIMITS TEST (U-U)	WATER DRY NO. 200 Shear Conf. Shear	Type (blows/ft.) (%) (pcf)	2.0         UD         16         Lean Clay	4.0 UD 14 Lean Clay	6.0 UD 15 Lean Clay	8.0 UD 12 Lean Clay	10.0 UD 13 117 31 16 15 78 1.52 0.72 1.13 2.25 Leon Cloy	12.0 UD 14 Leon Clay	13.5 SS 14 13 56 Sandy Silt	15.0 UD 19 Sandy Lean Cloy							= UNDISTURBED SAMPLE, EXTRUDED IN FIELD SpT = Standard Penetration Test SPIT SPOON SAMPLE
TORY TEST NEERING, I				an	an	an	an	gn	On		gn							LE, EXTRUDED LE
ARY OF LABORA CEOTEST ENCI	SAMPLE	Depth (ft.)	Bottam	0.8 2.0	2.0 4.0	4.0 6.0	6.0 8.0	8.0 10.0	10.0 12.0	12.0 13.5	13.5 15.0							DISTURBED SAME
SUMMARY			NO. Top	GB-35 3 C	4	5	9	7 8	8 10	9 12	10 13							LEGEND: UD = UND SS = SPLI

	SUMM	IARY OF	7 LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH Wa	ter Line Re	placeme -0185-	.⊑	Kickerillo	Area	
		GEOTE	ST ENC	ZINEE	CEOTEST ENGINEERING, INC.			PRO.	PROJECT	NUMB	Houston, ER: 11401	Houston, Texas NUMBER: 1140194601		ז			
		SAN	SAMPLE					ПА	ATTERBERG LIMITS	ပ္		UNCONFINED COMPRESSION TEST	1	TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
SNIGOR		De (†	Depth (ft.)			WATER	DRY	1	ā	Τ	PASSING NO. 200		Shear	Conf.	Shear	Shear	
NO.	No.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	∃	പ	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
C8-36 (C8-36P)	3	0.5	2.0	AG		6											Lean Clay
	4	2.0	3.0	an		6		31	15	16	91					2.25	Lean Clay
	5	3.0	4.0	gn		б									1.13	2.25	Lean Clay
	9	4.0	6.0	9		12									2.25	2.25	Lean Clay
	7	6.0	8.0	g,		-	121	35	17	18	81		2.94	0.58	2.25	2.25	Lean Clay
	00	8.0	10.0	9		10									1.50	2.25	Lean Clay
	б	10.0	12.0	9		13									1.75	2.25	Lean Clay
	10	12.0	14.0	g,		16									1.63	2.25	Lean Clay
LEGEND:	SSS X N N N N	UNDISTU SPLIT SF AUGER C PITCHER Nx-DOUE	= UNDISTURBED SAMPLE, EXTRUDE SPLIT SPOON SAMPLE AUGER CUTINGS PITCHER BARREL SAMPLE NX—DOUBBLE BARREL SAMPLE	APLE, E PLE SAMPLE REL SA	EXTRUDED IN FIELD LE AMPLE	1ELD		SPT	= Stan = Liqui = Plas = Plast	ndord P id Limit itic Limit iicity In	Standord Penetration Test Liquid Limit Plastic Limit Plasticity Index	ast se					
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V	SUMM	fary of	LABOR	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	E: COH WC	ter Line Re . S-000035	placeme -0185-	Ë	Kickerillo Area	Area	
		CEOTE	CEOTEST ENCINEERING,	JINEE	ERING, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601	) ) -	<b>)</b>			
		SAN	SAMPLE					АП	ATTERBERG LIMITS	ည့		UNCONFINED COMPRESSION TEST	1	TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
BORING		De (f	Depth (ft.)			WATER	DRY	=	ō	ō	PASSING NO. 200	Shear	Shear	Conf.	Shear	Shear	
NO.	O	Тор	Bottom	Туре	(blows/ft.)	(%) (%)	(pcf)	3	7	<u>.                                    </u>	SiEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-37	7	0.8	2.0	On .		22									0.35	0.50	Lean Clay
	ю	2.0	4.0	an		20									1.00	2.00	Lean Clay
	4	4.0	6.0	Ωn		18		44	20	24	95				1.50	2.25	Lean Clay
	5	6.0	8.0	g		16									0.75	2.25	Lean Clay
	9	8.0	10.0	<u>a</u>		15	117	34	16	81	72		0.96	0.72	0.88	1.63	Lean Clay
	7	10.0	12.0	9		14									1.25	2.00	Lean Clay
	æ	12.0	14.0	g		15			************						1.25	2.00	Lean Clay
											THE REAL PROPERTY AND ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY ADDRESS OF THE PERTY						
LEGEND:	SS X PB BB BB BB BB	SPLIT SF AUGER C PITCHER Nx-DOUE	IRBED SAN POON SAM UTTINGS BARREL (	APLE, 1 IPLE SAMPLE REL SA	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS PITCHER BARREL SAMPLE Nx—DOUBBLE BARREL SAMPLE	FIELD		SPT .	= Stor = Liqu	ndard I aid Lim stic Lin ticity Ir	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
											***************************************						VARIATION OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF T

•	SUMN	(ARY O	F LABOR	LATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAME	COH WC	iter Line Re . S-000035	placeme -0185-	int in t	\ickerillo	Area	
		CEOTE	CEOTEST ENCINEERINC,	SINEE	RING, INC.			PRO	PROJECT	NUMB	Houston 3ER: 1140	Houston, Texas NUMBER: 1140194601	)	)			
		SA	SAMPLE					ATT	ATTERBERG LIMITS	ပ္		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE – TROMETER	
BORING	•	De C	Depth (ft.)		SPT	WATER	DRY		ã	ā	PASSING NO. 200 SIEVE	Shear	Shear	Canf.	Shear	Shear	
NO.	Ng.	Тор	Bottom	Туре	(blows/ft.)	(%)	(pct)	ŀ	- J		(%)		(tsf)		(tsf)	(tsf)	TYPE OF MATERIAL
GB-38	2	1.0	2.0	9		19									1.25	1.13	Lean Clay
	ъ	2.0	4.0	g		25									0.63	0.88	Lean Clay
	4	4.0	6.0	an		22									0.50	0.63	Lean Clay
	5	6.0	8.0	9		17									1.25	1.38	Lean Clay
	9	8.0	10.0	g		17	114	47	18	29	88		1.39	0.72	1.50	1.63	Lean Clay
A consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence of the consequence	7	10.0	12.0	9		16									1.63	2.00	Lean Clay
	ω	12.0	14.0	gn		16						and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s			1.25	1.63	Lean Clay
	6	14.0	15.0	G)		14									1.00	1.25	Lean Clay
			***												-		
												ALADONA MANAGEMENT OF TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPORTED AND TRANSPOR					
LEGEND:	SS SS SS SS SS SS SS SS SS SS SS SS SS	SPLIT SI AUGER ( PITCHER	JRBED SAN POON SAM SUTTINGS BARREL BARREL	APLE, I	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS TITCHER BARREL SAMPLE NA-DOURDER BARBEL SAMPLE	FIELD		S 기리교 기급교	= Stan = Liqui = Plos = Plost	dord Fid Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limitic Limit	= Standord Penetration Test = Liquid Limit = Plostic Limit : Plosticity Index	est					
		NX-VCC	מפרב מאוי	אבר א	NMP LE												PARTY CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTR

	SUMA	AARY OI	F LABOF	PATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	E: COH WG WBS No	NAME: COH Water Line Replacement WBS No. S-000035-0185-3	placeme -0185-	.⊑	Kickerillo	Area	
		CEOTE	CEOTEST ENGINEERING,	SINEE	RING, INC.			PRO	PROJECT		Houston BER: 1140	, Texas 194601					
		SA	SAMPLE					ATT	ATTERBERG LIMITS	<u>ي</u>		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE— TROMETER	
		De (1	Depth (ft.)			WATER	DRY	l	ī	i	PASSING NO. 200		Shear	Conf.	Shear	Sheor	
BORING NO.	Š.	Тор	Bottam	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)		<u> </u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-39	2	1.0	2.0	9		17									0.88	0.88	Leon Clay
	3	2.0	4.0	an		16									1.13	1.25	Lean Clay
	4	4.0	6.0	9		15									1.75	2.25	Lean Clay
	5	6.0	8.0	9		16									1.63	1.75	Lean Clay
	9	8.0	10.0	9		16									1.25	2.00	Fot Cloy
	7	10.0	12.0	an		17	108	51	21	30	88		1.00	0.86	1.25	1.25	Fot Clay
	8	12.0	14.0	Ωn		16									1.50	1.63	Fat Clay
	σ	14.0	15.0	an		18									1.25	0.88	Fot Clay
							THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY O				Transfer and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second						
LEGEND:	SSS AX N		JRBED SAN POON SAM CUTTINGS BARREL BBLE BAR	APLE, E IPLE SAMPLE REL SA	UNDISTURBED SAMPLE, EXTRUDED IN FIELD SPLIT SPOON SAMPLE. AUGER CUTTINGS PITCHER BARREL SAMPLE Nx—DOUBBLE BARREL SAMPLE	JELD		SPL	Stor	indord Jid Lim stic Lin sticity li	Standord Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					

	SUMA	IARY OF	LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH WG WBS No.	ter Line Rep S-000035	olaceme -0185-	nt in K	(ickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	NNE	RING, INC.			PRO	PROJECT	NUMB	Houston 3ER: 1140	Houston, Texas NUMBER: 1140194601	 	,			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	ပ္		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE TROMETER	
000		De (¢	Depth (ft.)			WATER	DRY	l	i	Τ	PASSING NO. 200	ĺ	Shear	Conf.	Shear	Shear	
BURING NO.	Š.	Тор	Bottom	Туре	SPI (blaws/ft.)	CONIEN (%)	(pcf)		<u> </u>	<u> </u>	SIEZE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-40	2	1.0	2.0	an		28									1.00	1.38	Lean Clay
	ъ	2.0	4.0	gn .		17									1.63	2.25	Lean Clay
	4	4.0	6.0	an		15									1.50	2.00	Lean Clay
	5	6.0	8.0	9		15									1.38	2.13	Leon Clay
	9	8.0	10.0	9		17	112	42	17	25	81		1.74	0.72	1.38	1.63	Lean Clay
	7	10.0	12.0	an		15									1.25	1.50	Lean Clay
	80	12.0	14.0	Ωn		20									0.75	0.63	Lean Clay
	6	14.0	15.0	an		18									0.35	0.63	Lean Clay
LEGEND:	SS AG AG AG AG AG AG AG AG AG AG AG AG AG	SPLIT SF SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTINGS = PITCHER BARREL SAMPLE = NX-DOURRIF RARREL SAMPLE	APLE, E PLE SAMPLE	<u>≅</u>	FIELD		유기교교	= Stan = Liqui = Plas = Plast	id Limit id Limit itic Lim ticity In	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
				,	וונון דר												

S PROJECT NAME: COH Water Line Replacement in Kickerillo Area WBS No. S-000035-0185-3 Houston, Texas PROJECT NUMBER: 1140194601	ATTERBERG UNCONFINED TRIAXIAL POCKET COMPRESSION TORVANE PENE— TEST (U-U)	DRY NO. 200 Shear Conf. Shear	DENSITY LL PL PI (pcf)	4 1.00 1.63 Lean Clay	4 2.00 2.25 Lean Clay	2.25 2.25 Leon	5 1.88 2.00 Fat Clay	5 113 59 23 36 87 1.14 0.72 1.63 1.38 Fat Cloy	0 1.00 0.88 Fot Clay	1.00 1.13 Fot Clay	3         59         23         36         85         0.65         1.15         1.00         0.50         Fot Clay	0.60 1.00 Fot Clay	3 0.88 1.00 Fot Clay							SPT = Standard Penetration Test LL = Liquid Limit PL = Plastic Limit Pl = Plasticity Index
eplacer 5-018:		0	Streng (tsf)					1.1			9.0									The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon
uter Line R b. S-00003 1, Texas 194601	UNCONFINED COMPRESSIO TEST	Shear	Strength (tsf)																	est
4E: COH Wc WBS Nc Houstor 4BER: 1140	770 a and a declaration of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the	PASSING NO. 200	SIEVE (%)		And the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s			87			85									Penetration 1 nit imit Index
	ERG		<u>a</u>					36			36									tandord quid Lir lastic L asticity
ROJEC	ATTERB		<del></del>																	 nnnn
4 4		1															<b>71.</b>			 유그목모
								113			109									
SULTS		WATER	CONTENT (%)	14	14	41	16	16	20	21	20	20	23							FIELD
SUMMARY OF LABORATORY TEST RESULTS CEOTEST ENCINEERINC, INC.			SPT (blows/ft.)																	Ω. N
ATOR)			Туре	9	an	g	9	S	an B	9	g	9	g							PLE, E) PLE SAMPLE
LABOR T ENC	LE		Bottom	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0							= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTTINGS = PITCHER BARREL SAMPLE
ARY OF LA	SAMPLE	Depth (ft.)	Top	1.2	2.0	4.0	0.9	8.0	10.0	12.0	14.0	16.0	18.0							UISTURE LIT SPO SER CUI
JMMAF C.			No.	2	3	4	5	9	7	8	6	5	11							11 13 13
. IS		I.	BORING NO.	GB-41									·	77.1.1						LEGEND: UD SS AG AG PB

	SUMN	IARY OF	F LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	l	COH Wa	ter Line Rep	laceme	nt in K	ickerillo	Area	
		CEOTEST	1	NINEE	ENGINEERING, INC.			PRO	PROJECT	NUMB	Houston, ER: 11401	Houston, Texas NUMBER: 1140194601		)			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	sc sc		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
0		De (t	Depth (ft.)			WATER	DRY			Ι	PASSING NO. 200		Shear		Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	SPI (blaws/ft.)	CONTENT (%)	DENSITY (pcf)	Ⅎ	<u></u>	<u></u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-42	2	1.0	2.0	an		13									1.50	2.25	Lean Clay
	3	2.0	4.0	<u>a</u>		12		***************************************							2.25	2.25	Lean Clay
	4	4.0	6.0	an		12	114	47	20	27	83		2.71	0.43	2.25	2.25	Lean Clay
	5	6.0	8.0	9		15									2.00	2.25	Fat Clay
	9	8.0	10.0	gn		16									1.75	2.25	Fat Clay
	7	10.0	12.0	an		17									1.88	2.25	Fat Clay
	8	12.0	14.0	an	and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	17									2.00	2.13	Fat Clay
	6	14.0	16.0	an		19	109	55	20	35	87		1.41	1.15	1.13	1.63	Fat Clay
	5	16.0	18.0	an		20									0.88	1.00	Fat Clay
	1	18.0	20.0	S		19									1.25	1.50	Fat Clay
LEGEND:	SS SS X		JRBED SAN POON SAM JUTTINGS BARREL S	APLE, E PLE SAMPLE SEL SA	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTINGS ATICHER BARREL SAMPLE Nx—DOUBBLE BARREL.	FIELD		SPT	= Stor = Liqu = Plos	ndard P iid Limit stic Lim ticity In	Stondord Penetrotion Test Liquid Limit Plostic Limit Plosticity Index	est					
															***************************************		

0,3	SUMM	IARY OF	F LABOF	MATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	i	E: COH WC WBS No	ter Line Re . S-000035	placeme -0185-	nt in K	ickerillo ,	Area	
		CEOTE	CEOTEST ENCINEERING,	FINE	RING, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601		1			
		SAN	SAMPLE					ATT	ATTERBERG LIMITS	<u>2</u>		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
ON		De (†	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200		Shear		Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	(blows/ft.)	CONIENI (%)	DENSIIY (pcf)	3	<u> </u>	n.	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-43	2	1,0	2.0	S		14									1.63	1.50	Lean Clay
	3	2.0	4.0	9		14									0.88	2.13	Lean Clay
	4	4.0	6.0	9		15	115	46	20	26	77		0.91	0.43	1.38	1.00	Lean Clay
	သ	6.0	8.0	ΩΩ	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	12									1.13	1.63	Lean Clay
	٥	8.0	10.0	g,		14									1.50	1.63	Lean Clay
	7	10.0	12.0	9		19						and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s			0.55	0.50	Lean Clay
	80	12.0	14.0	<u>a</u>		21									0.75	0.88	Lean Clay
	6	14.0	16.0	gn		19	109	28	13	15	65		0.31	1.15	0.40	0.50	Sandy Lean Clay
	5	16.0	18.0	g		19									0.25	0.50	Sandy Lean Clay
	=	18.0	20.0	an		20									1.75	1.88	Fat Clay
LEGEND:	SSS N× PB = = =	UNDISTU SPLIT SF AUGER C PITCHER Nx-DOUE	= UNDISTURBED SAMPLE, EXTRUDI = SPLIT SPOON SAMPLE = AUGER CUTINGS = PITCHER BARREL SAMPLE = Nx—DOUBBLE BARREL SAMPLE	APLE, F PLE SAMPLE REL SA	≅ Q:	FIELD		SPT P	= Stor = Liqu = Plos	indord l id Lim stic Lin sticity l	Standord Penetration Test Liquid Limit Plastic Limit Plasticity Index	est					
	1																

JMMAR	3	Y OF	' LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC WBS No	NAME: COH Water Line Replacement WBS No. S-000035-0185-3	placeme 5-0185-	nt in k	in Kickerillo Area	Area	
CEOTEST	CEOTE		ST ENC	:INEE	ENGINEERING, INC.			PRO	PROJECT		Houston BER: 1140	ı, Texas 194601					
δ	ζÌ	2	SAMPLE					ATT	ATTERBERG LIMITS	RG S		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		Det	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200	Shear	Shear	Conf.	Shear	Shear	
No. Top	卢		Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)		7	<u>n</u>	SiEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
2 1.0	+	0	2.0	AG		12											Sandy Lean Clay
3 2	2	2.0	4.0	On		18									2.25	2.25	Fat Clay
4	4	4.0	6.0	an		13									2.25	2.25	Fat Cloy
2	Ψ.	6.0	8.0	an		13	122	52	21	31	74		2.89	0.58	2.25	2.25	Fat Clay
9	Ψ.	8.0	10.0	9		20									2.25	2.13	Fat Clay
7 1(	=	10.0	12.0	gn		30		73	29	44	89				0.40	0.50	Fat Clay
8 1;	=	12.0	14.0	an		23									1.38	2.25	Fat Clay
6	-	14.0	15.0	On.		23									1.25	2.25	Fat Clay
				***********								***************************************					
																	ANTICA EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE EXPENSIVE
UD = UNDI SS = SPLII AG = AUGE PB = PITCH Nx = Nx-E	SPL: SPL: SPL: SPIC: SPIC:	TSTU SPER SOURCE	RBED SAN 200N SAM 20TINGS BARREL 3	APLE, E IPLE SAMPLE REL SAI	UNDISTURBED SAMPLE, EXTRUDED IN FIELD SPLIT SPOON SAMPLE. AUGER CUTTINGS PITCHER BARREL SAMPLE Nx—DOUBBLE BARREL SAMPLE	TELD		2 고 고	Sto Liqu	undard uid Lim ustic Lin sticity li	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	Fest					
							ţ					***************************************					transcription desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and second desirates and se

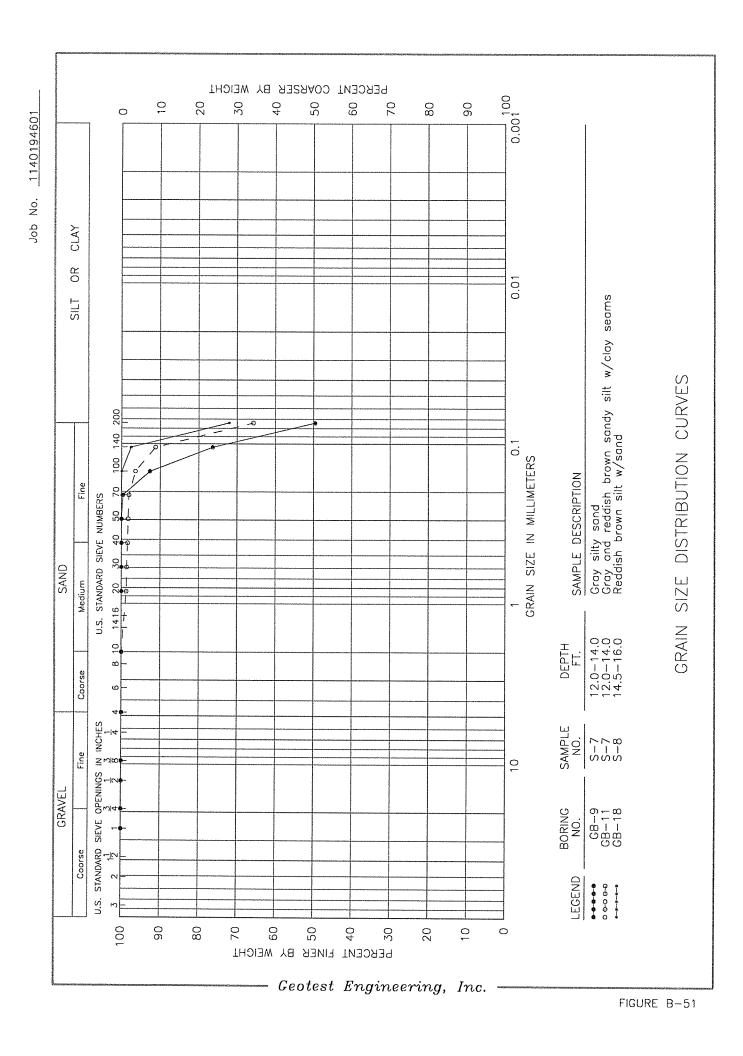
	SUMA	AARY O	F LABOF	RATOF	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC	ter Line Re S-000035	placeme -0185-	ء.	Kickerillo	Area	
		CEOTEST		CINE	ENGINEERING, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601	) ) -	)			
		SA	SAMPLE					ATT	ATTERBERG LIMITS			UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
		De	Depth (ft.)			WATER	DRY	1	i	i	PASSING NO. 200	Shear	1 0	Conf.		Shear	
NO.	No.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	3	<u> </u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-45	2	1.0	3.0	gn		15									0:30	0.63	Leon Clay
	3	3.0	5.0	g		17									0.75	0.75	Leon Cloy
	4	5.0	7.0	an		18									0.75	0.75	Lean Clay
	5	7.0	9.0	an		19	107	32	15	17	85		0.53	0.65	0.63	0.50	Lean Clay
	9	9.0	11.0	an		18									0.63	1.13	Lean Clay
	7	11.0	13.0	an		18									0.38	1.13	Leon Clay
	ю	13.0	15.0	an		19			***************************************						0.63	0.88	Lean Clay
			-														
LEGEND:	SS SS S	SPLIT SI AUGER (	= UNDISTURBED SAMPLE, EXTRUD = SPLIT SPOON SAMPLE = AUGER CUTINGS = PITCHER BARREL SAMPLE = NY-DOJINRI F RARPET SAMPLE	MPLE, APLE SAMPLE	ED	FIELD		ST T G	= Stor = Liqu = Plas	ndord I lid Lim stic Lin	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					
***************************************	, ,	-44	וויייייייייייייייייייייייייייייייייייי	וור ה	J'AMI' L'E							***************************************					

	SUMN	IARY OI	LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRC	JECT	PROJECT NAME:	IE: COH WC	ter Line Re	placeme	<u>ء</u> .	Kickerillo	Area	
		GEOTEST	ST ENC	:INE	ENGINEERING, INC.			PRC	PROJECT		WBS NO Houston 18ER: 1140	WBS NO. 3-000033-0163-3 Houston, Texas NUMBER: 1140194601		· ·			
		SAM	SAMPLE					AT	ATTERBERG LIMITS	S _C	TALLER OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE	UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	
g		De (f	Depth (ft.)			WATER	DRY		i		PASSING NO. 200	Shear	Shear	Conf.		Shear	
NO.	Š.	Тор	Bottom	Type	(blows/ft.)	CONIENI (%)	(pcf)	∃	<u> </u>	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
CB-46	2	6:0	2.0	9		22									0.50	0.38	FIII
	33	2.5	4.0	SS	21	14											Fill
	4	4.0	6.0	9		25											FI
	5	6.0	8.0	Ωn		20	108	54	22	32	87		0.73	0.58	1.00	0.88	Fat Clay
	9	8.0	10.0	gn .		17									1.25	1.25	Fat Clay
	7	10.0	12.0	9		20									1.00	0.88	Fat Clay
	8	12.0	14.0	gn .		19									0:20	0.75	Fat Clay
	6	14.0	16.0	an		18	110	49	19	30	89		0.88	1.15	1.50	1.50	Lean Clay
	5	16.0	18.0	an		22									1.63	1.75	Lean Clay
	-	18.0	20.0	an		16									1.63	2.25	Lean Clay
											en still man er en en mykrafaren en skifaren en skifaren kalanda.						
											est manual pur proprior propri	And the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t					TO A TO A TO A TO A TO A TO A TO A TO A
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LEGEND:	UD SS AG == == Nx == ==	SPLIT SF AUGER C PITCHER	<ul> <li>UNDISTURBED SAMPLE, EXTRUDI</li> <li>SPLIT SPOON SAMPLE</li> <li>AUGER CUTTINGS</li> <li>PITCHER BARREL SAMPLE</li> <li>Nx-DOUBBLE BARREL SAMPLE</li> </ul>	APLE, FPLE PLE SAMPLE	NI QI	FIELD		SPT LL P!	Sto	andard uid Lin ıstic Li sticity	Standard Penetration Test Liquid Limit Plastic Limit Plasticity Index	lest					

-	SUMM	IARY OF	7 LABOR	PATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT		E: COH WC	ter Line Re S-000035	olaceme -0185-	nt in K	ickerillo	Area	
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		SAN	SAMPLE					ATT	ATTERBERG LIMITS	25		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE - TROMETER	And the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t
G		De C+	Depth (ft.)			WATER	DRY	1			PASSING NO. 200		Shear	T		Shear	
NO.	Š.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	3	₹	<u>.</u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-47	2	1.0	2.0	an		19									1.00	0.88	Lean Clay
	3	2.0	4.0	an		19									1.25	1.13	Lean Clay
	4	4.0	6.0	9		19									1.13	1.13	Lean Clay
	2	6.0	8.0	Ωn		19									1.00	0.88	Lean Clay
	9	8.0	10.0	an		20									1.25	1.13	Lean Clay
	7	10.0	12.0	S		21	107	49	21	28	90		0.78	0.86	1.00	1.00	Lean Clay
	80	12.0	13.0	9		20									1.00	0.88	Lean Clay
	6	13.0	15.0	an		22									0.88	1.00	Lean Clay
	***************************************																
													and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th				
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LEGEND:	SSS X BBG N	UNDISTU SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDI SPLIT SPOON SAMPLE A AUGER CUTTINGS PITCHER BARREL SAMPLE • Nx-DOUBBLE BARREL SAMPLE	APLE, P PLE SAMPLE SEL SA	<u>2</u>	FIELD		SPT	= Stor = Liqui = Plos	ndard iid Lim stic Lin ticity li	Standard Penetration Test Liquid Limit Plostic Limit Plosticity Index	est					

	SUMN	IARY OI	7 LABOR	ATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	JECT	PROJECT NAME:	COH WG	ter Line Rey S-000035	olaceme -0185-	nt in K	Cickerillo	Area	
		CEOTE	CEOTEST ENCINEERING,	FINE	RING, INC.	_		PRO	PROJECT	NUME	Houston 3ER: 11401	Houston, Texas NUMBER: 1140194601	) )	)			
		SA	SAMPLE					ATT	ATTERBERG LIMITS	ల్ల		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE- TROMETER	
Ciado		De De	Depth (ft.)			WATER					PASSING NO. 200	1	Shear	Conf.	Shear	Shear	
NO.	No.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	DENSITY (pcf)	Ⅎ	٦	<u> </u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-48	2	1.0	2.0	9		18									1.00	1.13	FII
	ω	2.5	4.0	SS	17	10										Name of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party of the Party	FIII
	4	4.5	6.0	SS	22	13					19						FBI
	S	6.0	8.0	gn		25									0.70	0.75	Fill
	9	8.0	10.0	9		20	110	58	23	35	06		0.83	0.72	1.00	1.00	Fat Clay
	7	10.0	12.0	gn		23									1.00	1.25	Fat Clay
	ω	12.0	14.0	gn		21									1.50	1.50	Fat Clay
	6	14.0	16.0	9		20	108						0.83	1.15	1.63	1.50	Fat Clay
	0,	16.0	18.0	an		20									1.25	1.25	Fat Clay
		18.0	20.0	9		18		37	16	21	89				0.75	1.13	Sandy Lean Clay
			۵														
LEGEND:	SSS AS	UNDISTU SPLIT SF AUGER C PITCHER	= UNDISTURBED SAMPLE, EXTRUDE = SPLIT SPOON SAMPLE = AUGER CUTINGS = PITCHER BARREL SAMPLE = Nx-DOJIRRI F RARREL SAMPLE	APLE, E PLE SAMPLE	Θ	IN FIELD		R P P	= Stan = Liqui = Plas = Plast	ndard F id Limi stic Lim ticity In	Standord Penetration Test Liquid Limit Plostic Limit Plasticity Index	est					
	1																

0,1	SUMM	(ARY 0)	F LABOF	RATOR	SUMMARY OF LABORATORY TEST RESULTS	SULTS		PRO	PROJECT	NAM	E: COH WC WBS No	ter Line Re . S-000035	placeme -0185-	3 in k	ickerillo	Area	
	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	CEOTE	CEOTEST ENCINEERING,	SINEE	FRING, INC.			PRO	PROJECT		Houston BER: 1140	Houston, Texas NUMBER: 1140194601	l	ı			
		SA	SAMPLE					ATT	ATTERBERG LIMITS	ည		UNCONFINED COMPRESSION TEST		TRIAXIAL COMPRESSION TEST (U-U)	TORVANE	POCKET PENE— TROMETER	
		De (1	Depth (ft.)			WATER	DRY		i	i	PASSING NO. 200		Shear		Shear	Shear	
NO.	Š.	Тор	Bottom	Туре	SPI (blows/ft.)	CONTENT (%)	(pcf)	Ⅎ	<u> </u>	<u>.</u>	SIEVE (%)	Strength (tsf)	Strength (tsf)	Press. (tsf)	Strength (tsf)	Strength (tsf)	TYPE OF MATERIAL
GB-50	2	1.0	2.0	g		27									0:20	0.63	Sandy Lean Clay
	3	2.0	4.0	an		18									0.75	1.00	Sandy Lean Clay
	4	4.0	9.0	g		16									1.13	1.25	Sandy Lean Clay
	Ω.	6.0	8.0	an		15									1.25	1.38	Sandy Lean Clay
	g	8.0	10.0	an		15									1.00	1.50	Sandy Lean Clay
	7	10.0	12.0	9		16	118	40	16	24	70		1.07	0.86	0.88	1.25	Sandy Lean Clay
	∞	12.0	14.0	9		15									1.25	1.50	Sandy Lean Clay
	6	14.0	15.0	an		16									1.25	1.25	Sandy Lean Clay
																	AND AND AND AND AND AND AND AND AND AND
									***************************************								
LEGEND:	SS SS X	SPLIT SI AUGER ( PITCHER Nx-DOUI	JRBED SAN POON SAM CUTTINGS BARREL BAILF BARE	MPLE, I IPLE SAMPLE RFI SA	UNDISTURBED SAMPLE, EXTRUDED IN F SPLIT SPOON SAMPLE AUGER CUTTINGS PITCHER BARREL SAMPLE Nx-DOUBBIF BARRE! SAMPLE	FIELD		SPI TE	= Stor = Liqu = Plos = Plos	ndard Jid Lim Stic Lin sticity I	Standard Penetration Test Liquid Limit Plostic Limit Plasticity Index	est					



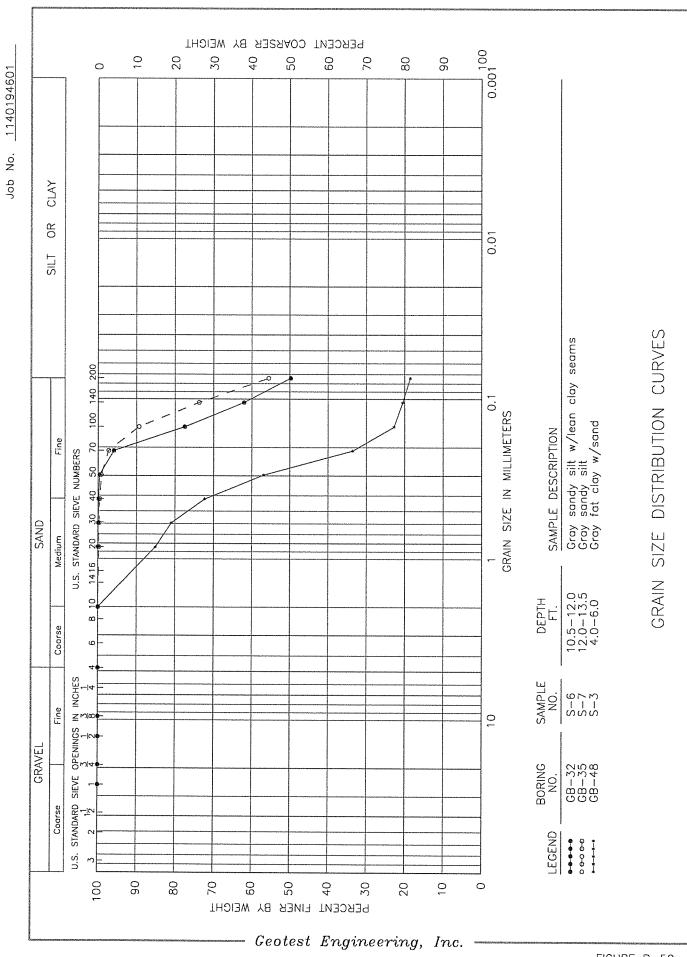


FIGURE B-52

# APPENDIX C

Piezometer Abandonment Reports

STATE OF TEXAS PLUGGING REPORT for Tracking #89213

Owner:

Geotest Engineering, Inc

Owner Well #:

GB-1P

Address:

5600 Bintliff Rd.

Houston, TX 77036

Grid #:

65-12-7

Well Location:

Chadbourne Dr.

Houston, TX 77056

Latitude:

29° 46' 08" N

Well County:

Harris

Longitude:

095° 36' 06" W

GPS Brand Used:

Lowrance XOG

Well Type:

**Monitor** 

### HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well

Driller:

Dempsey Gearen Jr.

Driller's License

Number of

Original Well

Driller:

Date Well Drilled:

5/6/2013

2836

Well Report

324091 Tracking Number:

Diameter of Borehole:

5" inches

Total Depth of Borehole:

15' feet

Date Well

8/12/2013

Dempsey Gearen Jr.

Plugged:

Person Actually

Performing

Plugging

Operation:

License Number

2836

of Plugging Operator:

Plugging Method:

Tremmie pipe cement from bottom to top.

Plugging

Variance #:

No Data

Casing Left Data:

1st Interval: 0 inches diameter, (No Data) ft to (No Data) ft

2nd Interval: No Data 3rd Interval: No Data

Cement/Bentonite 1st Interval: From 0 ft to 15 ft; Sack(s)/type of cement used: 1 Portland

Plugs Placed in

2nd Interval: No Data

8/13/13

Well:

3rd Interval: No Data 4th Interval: No Data 5th Interval: No Data

Certification Data:

The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: Dempsey Gearen Jr. 32126 Rochen Rd. Waller, TX 77484

Plug Installer

2836

License Number:

Dempsey Gearen Jr.

Licensed Plug Installer Signature:

Registered Plug No Data Installer

**Apprentice** Signature:

**Apprentice** 

No Data

Registration Number:

Plugging Method

No Data

Comments:

Please include the plugging report's tracking number (Tracking #89213) on your written request.

**Texas Department of Licensing & Regulation** P.O. Box 12157 **Austin, TX 78711** (512) 463-7880

STATE OF TEXAS PLUGGING REPORT for Tracking #89216

Owner:

Geotest Engineering, Inc

Owner Well #:

**GB-22P** 

Address:

5600 Bintliff Dr.

Houston, TX 77036

Grid #:

65-12-7

Well Location:

Kellywood Lane

Houston, TX 77056

Latitude:

29° 45' 54" N

Well County.

Harris

Longitude:

095° 35' 51" W

GPS Brand Used:

Lowrance XOG

Well Type:

Monitor

2836

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well

Driller:

Dempsey Gearen Jr.

Driller's License

Number of

Original Well Driller:

Date Well Drilled: 5/6/2013

Well Report

Tracking Number:

Diameter of

Borehole:

5" inches

324094

Total Depth of

Borehole:

18' feet

Date Well

8/12/2013

Dempsey Gearen Jr.

Plugged:

Person Actually

Performing

Plugging

Operation:

2836 License Number

of Plugging Operator:

Plugging Method: Tremmie pipe cement from bottom to top.

Plugging

Variance #:

No Data

Casing Left Data:

1st Interval: 0 inches diameter, (No Data) ft to (No Data) ft

2nd Interval: No Data 3rd Interval: No Data

Cement/Bentonite 1st Interval: From 0 ft to 18 ft; Sack(s)/type of cement used: 1 1/2 Portland

Plugs Placed in 2nd Interval: No Data

1/2

8/13/13

Well:

3rd Interval: **No Data** 4th Interval: **No Data** 5th Interval: **No Data** 

Certification Data:

The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information:

Gearen Drilling 32126 Rochen Rd. Waller, TX 77484

Plug Installer

2836

License Number:

Licensed Plug Dempsey Gearen Jr.

Installer Signature:

Registered Plug N

No Data

Installer Apprentice Signature:

Apprentice

No Data

Registration Number:

Plugging Method

No Data

Comments:

Please include the plugging report's tracking number (Tracking #89216) on your written request.

Texas Department of Licensing & Regulation P.O. Box 12157 Austin, TX 78711 (512) 463-7880 STATE OF TEXAS PLUGGING REPORT for Tracking #89214

Owner:

Geotest Engineering, Inc

Owner Well #:

**GB-36P** 

Address:

5600 Bintliff Rd.

Houston, TX 77036

Grid #:

65-12-7

Well Location:

Heatherfield Dr.

Houston, TX 77056

Latitude:

29° 45' 39" N

Well County:

Harris

Longitude:

095° 35' 28" W

GPS Brand Used:

Lowrance XOG

Well Type:

Monitor

### HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well

Dempsey Gearen Jr.

Driller:

Driller's License

Number of Original Well Driller:

2836

Date Well Drilled:

5/6/2013

Well Report

324097

Tracking Number:

Diameter of Borehole:

5" inches

Total Depth of Borehole:

14' feet

Date Well

8/12/2013

Dempsey Gearen Jr.

Plugged:

Person Actually

Performing Plugging

Operation:

2836 License Number

of Plugging Operator:

Plugging Method:

Tremmie pipe cement from bottom to top.

Plugging

Variance #:

No Data

Casing Left Data:

1st Interval: 0 inches diameter, (No Data) ft to (No Data) ft

2nd Interval: No Data 3rd Interval: No Data

Cement/Bentonite 1st Interval: From 0 ft to 14 ft; Sack(s)/type of cement used: 1 Portland

Plugs Placed in

2nd Interval: No Data

٨ ١٠٥١ سامم ١٠٠٠ عمليم المسموسية عن المال المساحد الالمالات

8/13/13

Well:

3rd Interval: No Data 4th Interval: No Data 5th Interval: No Data

Certification Data: The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: Dempsey Gearen Jr. 32126 Rochen Rd. Waller, TX 77484

Plug Installer

2836

License Number:

Dempsey Gearen Jr.

Licensed Plug Installer Signature:

Registered Plug Installer

**Apprentice** Signature:

No Data

Apprentice Registration Number:

No Data

Plugging Method

No Data

Comments:

Please include the plugging report's tracking number (Tracking #89214) on your written request.

Texas Department of Licensing & Regulation P.O. Box 12157 **Austin, TX 78711** (512) 463-7880

STATE OF TEXAS PLUGGING REPORT for Tracking #89215

Owner:

Geotest Engineering, Inc

Owner Well #:

**GB-49P** 

65-12-7

Address:

5600 Bintliff Rd.

Houston, TX 77036

Well Location:

White Wing

Houston, TX 77056

Latitude:

Grid #:

29° 46' 12" N

Well County:

Harris

Longitude:

095° 35' 29" W

GPS Brand Used:

Lowrance XOG

Well Type:

**Monitor** 

### HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well

Dempsey Gearen Jr.

Driller:

Driller's License

2836

Number of Original Well Driller:

Date Well Drilled:

5/6/2013

Well Report

324100

Tracking Number:

Diameter of

5" inches

Borehole:

Total Depth of

20' feet

Borehole:

Date Well

8/12/2013

Dempsey Gearen Jr.

Plugged:

Person Actually

Performing

Plugging

Operation:

License Number 2836

of Plugging Operator:

Plugging Method:

Tremmie pipe cement from bottom to top.

Plugging

Variance #:

No Data

Casing Left Data:

1st Interval: 0 inches diameter, (No Data) ft to (No Data) ft

2nd Interval: No Data 3rd Interval: No Data

Cement/Bentonite 1st Interval: From 0 ft to 20 ft; Sack(s)/type of cement used: 1 1/2 Portland

Plugs Placed in 2nd Interval: No Data 8/13/13

Well:

3rd Interval: No Data 4th Interval: No Data 5th Interval: No Data

Certification Data: The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: Dempsey Gearen Jr. 32126 Rochen Rd. Waller, TX 77484

Plug Installer

2836

License Number:

Licensed Plug

Dempsey Gearen Jr.

Installer Signature:

Registered Plug

No Data

Installer **Apprentice** Signature:

**Apprentice** 

No Data

Registration Number:

Plugging Method

No Data

Comments:

Please include the plugging report's tracking number (Tracking #89215) on your written request.

Texas Department of Licensing & Regulation P.O. Box 12157 **Austin, TX 78711** (512) 463-7880

# APPENDIX D

Laboratory Corrosivity Test Report

# **Analytical Report 465370**

for **Geotest Engineering, Inc.** 

Project Manager: Mohan Ballagere
Waterline Replacement Kickerillo Area
1140194601
21-JUN-13

Collected By: Client





### 4143 Greenbriar Dr., Stafford, TX 77477

Xenco-Houston (EPA Lab code: TX00122):

Texas (T104704215-10-6-TX), Arizona (AZ0765), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002) Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054) New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610) Rhode Island (LAO00312), USDA (S-44102), DoD (L11-54)

Xenco-Atlanta (EPA Lab Code: GA00046): Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD ( L10-135) Louisiana (04176), USDA (P330-07-00105)

Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)

Xenco-Lakeland: Florida (E84098)

Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX) Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)

Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)

Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)

Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)





21-JUN-13

Project Manager: Mohan Ballagere

Geotest Engineering, Inc.

5600 Bintliff

Houston, TX 77036

Reference: XENCO Report No(s): 465370

Waterline Replacement Kickerillo Area

Project Address:

### Mohan Ballagere:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 465370. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 465370 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

**Debbie Simmons** 

Project Manager

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# **Sample Cross Reference 465370**



# Geotest Engineering, Inc., Houston, TX

Waterline Replacement Kickerillo Area

Sample Id	Matrix	<b>Date Collected</b>	Sample Depth	Lab Sample Id
GB-2 S#5	S	05-06-13 00:00	8 - 10 ft	465370-001
GB-5 S#5	S	05-06-13 00:00	8 - 10 ft	465370-002
GB-6 S#4	S	05-06-13 00:00	6 - 8 ft	465370-003
GB-7 S#4	S	05-06-13 00:00	6 - 8 ft	465370-004
GB-9 S#4	S	05-07-13 00:00	6 - 8 ft	465370-005
GB-13 S#6B	S	05-07-13 00:00	10 - 12 ft	465370-006
GB-16 S#5	S	05-08-13 00:00	8 - 10 ft	465370-007
GB-17 S#7	S	05-08-13 00:00	12 - 14 ft	465370-008
GB-22 S#7	S	05-06-13 00:00	12 - 14 ft	465370-009
GB-24 S#6	S	05-06-13 00:00	10 - 12 ft	465370-010
GB-34 S#4	S	05-06-13 00:00	6 - 8 ft	465370-011
GB-38 S#6	S	05-08-13 00:00	10 - 12 ft	465370-012
GB-41 S#6	S	05-08-13 00:00	10 - 12 ft	465370-013
GB-42 S#6	S	05-08-13 00:00	10 - 12 ft	465370-014
GB-43 S#7	S	05-08-13 00:00	10 - 12 ft	465370-015
GB-46 S#5	S	05-07-13 00:00	8 - 10 ft	465370-016
GB-48 S#7	S	05-07-13 00:00	12 - 14 ft	465370-017
GB-50 S#4	S	05-07-13 00:00	6 - 8 ft	465370-018



# **CASE NARRATIVE**



Client Name: Geotest Engineering, Inc.

Project Name: Waterline Replacement Kickerillo Area

 Project ID:
 1140194601
 Report Date:
 21-JUN-13

 Work Order Number(s):
 465370
 Date Received:
 06/20/2013

Sample receipt non conformances and comments:
Sample receipt non conformances and comments per sample:
None



**Project Location:** 

**Project Id:** 1140194601

Contact: Mohan Ballagere

# **Certificate of Analysis Summary 465370**

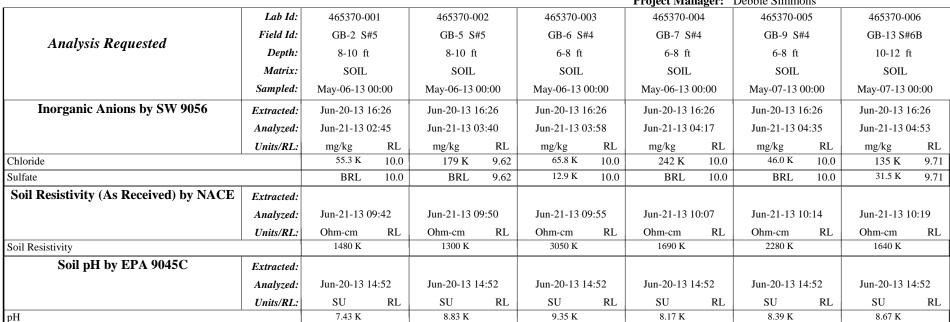
### Geotest Engineering, Inc., Houston, TX



**Date Received in Lab:** Thu Jun-20-13 10:40 am

**Report Date:** 21-JUN-13

Project Manager: Debbie Simmons



This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Debbie Simmons Project Manager



**Project Location:** 

**Project Id:** 1140194601

Contact: Mohan Ballagere

# **Certificate of Analysis Summary 465370**

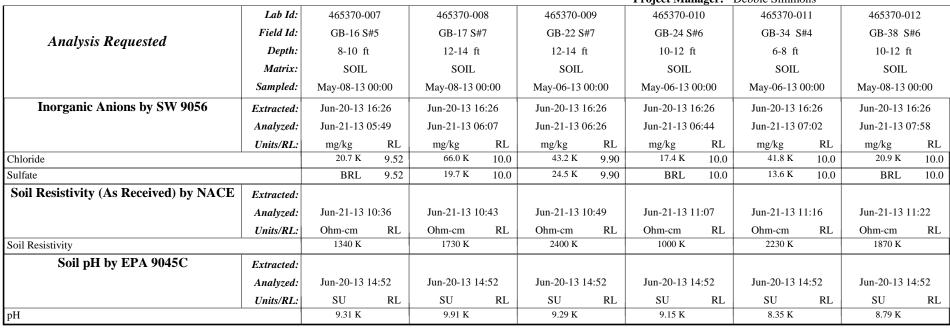
### Geotest Engineering, Inc., Houston, TX



**Date Received in Lab:** Thu Jun-20-13 10:40 am

**Report Date:** 21-JUN-13

**Project Manager:** Debbie Simmons



This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Debbie Simmons Project Manager



**Project Location:** 

**Project Id:** 1140194601

Contact: Mohan Ballagere

# **Certificate of Analysis Summary 465370**

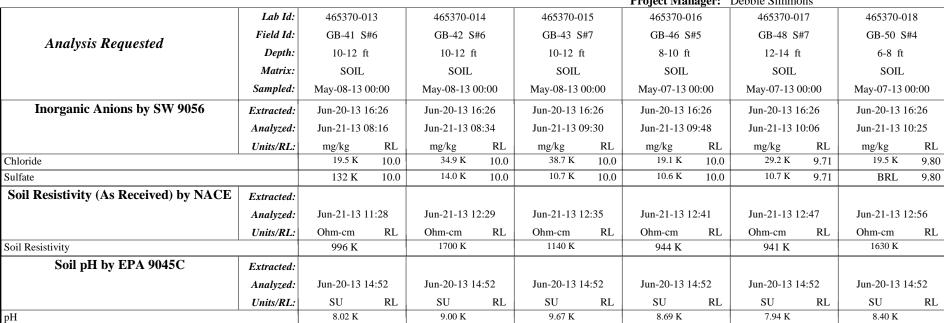
### Geotest Engineering, Inc., Houston, TX



**Date Received in Lab:** Thu Jun-20-13 10:40 am

**Report Date:** 21-JUN-13

**Project Manager:** Debbie Simmons



This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Debbie Simmons
Project Manager



### XENCO Laboratories CHRONOLOGY OF HOLDING TIMES



Analytical Method : Soil pH by EPA 9045C Client : Geotest Engineering, Inc.

Work Order #: 465370 Project ID: 1140194601

Field Sample ID	Date Collected	Date Received	Date Extracted	Max Holding Time Extracted (Days)	Time Held Extracte d (Days	Date Analyzed	Max Holding Time Analyzed (Days)	Time Held Analyzed ( <b>Days</b> )	Q
GB-17 S#7	May. 8, 2013	Jun. 20, 2013				Jun.20, 2013	28	43	F
GB-41 S#6	May. 8, 2013	Jun. 20, 2013				Jun.20, 2013	28	43	F
GB-6 S#4	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F
GB-7 S#4	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F
GB-16 S#5	May. 8, 2013	Jun. 20, 2013				Jun.20, 2013	28	43	F
GB-24 S#6	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F
GB-34 S#4	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F
GB-43 S#7	May. 8, 2013	Jun. 20, 2013				Jun.20, 2013	28	43	F
GB-50 S#4	May. 7, 2013	Jun. 20, 2013				Jun.20, 2013	28	44	F
GB-38 S#6	May. 8, 2013	Jun. 20, 2013				Jun.20, 2013	28	43	F
GB-5 S#5	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F
GB-9 S#4	May. 7, 2013	Jun. 20, 2013				Jun.20, 2013	28	44	F
GB-22 S#7	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F
GB-48 S#7	May. 7, 2013	Jun. 20, 2013				Jun.20, 2013	28	44	F
GB-13 S#6B	May. 7, 2013	Jun. 20, 2013				Jun.20, 2013	28	44	F
GB-42 S#6	May. 8, 2013	Jun. 20, 2013				Jun.20, 2013	28	43	F
GB-46 S#5	May. 7, 2013	Jun. 20, 2013				Jun.20, 2013	28	44	F
GB-2 S#5	May. 6, 2013	Jun. 20, 2013				Jun.20, 2013	28	45	F



### **XENCO Laboratories** CHRONOLOGY OF HOLDING TIMES



Analytical Method : <u>Inorganic Anions by SW 9056</u>	Client: Geotest Engineering, Inc.
Work Order #: 465370	Project ID: 1140194601

Field Sample ID	Date Collected	Date Received	Date Extracted	Max Holding Time Extracted (Days)	Time Held Extracte d (Days	Date Analyzed	Max Holding Time Analyzed (Days)	Time Held Analyzed ( <b>Days</b> )	Q
GB-17 S#7	May. 8, 2013	Jun. 20, 2013	Jun. 20, 2013	28	43	Jun.21, 2013	28	1	F
GB-24 S#6	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-6 S#4	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-34 S#4	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-42 S#6	May. 8, 2013	Jun. 20, 2013	Jun. 20, 2013	28	43	Jun.21, 2013	28	1	F
GB-9 S#4	May. 7, 2013	Jun. 20, 2013	Jun. 20, 2013	28	44	Jun.21, 2013	28	1	F
GB-13 S#6B	May. 7, 2013	Jun. 20, 2013	Jun. 20, 2013	28	44	Jun.21, 2013	28	1	F
GB-41 S#6	May. 8, 2013	Jun. 20, 2013	Jun. 20, 2013	28	43	Jun.21, 2013	28	1	F
GB-2 S#5	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-46 S#5	May. 7, 2013	Jun. 20, 2013	Jun. 20, 2013	28	44	Jun.21, 2013	28	1	F
GB-7 S#4	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-16 S#5	May. 8, 2013	Jun. 20, 2013	Jun. 20, 2013	28	43	Jun.21, 2013	28	1	F
GB-38 S#6	May. 8, 2013	Jun. 20, 2013	Jun. 20, 2013	28	43	Jun.21, 2013	28	1	F
GB-5 S#5	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-22 S#7	May. 6, 2013	Jun. 20, 2013	Jun. 20, 2013	28	45	Jun.21, 2013	28	1	F
GB-43 S#7	May. 8, 2013	Jun. 20, 2013	Jun. 20, 2013	28	43	Jun.21, 2013	28	1	F
GB-48 S#7	May. 7, 2013	Jun. 20, 2013	Jun. 20, 2013	28	44	Jun.21, 2013	28	1	F
GB-50 S#4	May. 7, 2013	Jun. 20, 2013	Jun. 20, 2013	28	44	Jun.21, 2013	28	1	F

 $F = These \ samples \ were \ analyzed \ outside \ the \ recommended \ holding \ time.$   $P = Samples \ analyzed \ within \ the \ recommended \ holding \ time.$ 



# **Flagging Criteria**



- X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- **B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- **D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F RPD exceeded lab control limits.
- J The target analyte was positively identified below the quantiation limit and above the detection limit.
- U Analyte was not detected.
- L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- **H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- **K** Sample analyzed outside of recommended hold time.
- **JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

**BRL** Below Reporting Limit.

**RL** Reporting Limit

MDL Method Detection Limit SDL Sample Detection Limit LOD Limit of Detection

PQL Practical Quantitation Limit MQL Method Quantitation Limit LOQ Limit of Quantitation

**DL** Method Detection Limit

NC Non-Calculable

- + NELAC certification not offered for this compound.
- * (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

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9701 Harry Hines Blvd , Dallas, TX 75220	(214) 902 0300	(214) 351-9139
5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
2505 North Falkenburg Rd, Tampa, FL 33619	(813) 620-2000	(813) 620-2033
12600 West I-20 East, Odessa, TX 79765	(432) 563-1800	(432) 563-1713
6017 Financial Drive, Norcross, GA 30071	(770) 449-8800	(770) 449-5477
3725 E. Atlanta Ave, Phoenix, AZ 85040	(602) 437-0330	

^{*} Surrogate recovered outside laboratory control limit.



# **Blank Spike Recovery**



# Project Name: Waterline Replacement Kickerillo Area

**Work Order #:** 465370 **Project ID:** 1140194601

 Lab Batch #: 916770
 Sample: 640005-1-BKS
 Matrix: Solid

 Date Analyzed: 06/21/2013
 Date Prepared: 06/20/2013
 Analyst: RKO

Reporting Units: mg/kg Batch #: BLANK /BLANK SPIKE RECOVERY STUDY Blank Blank Spike Blank Control **Inorganic Anions by SW 9056** Spike Result Added Spike Limits Flags [A] [B] Result %R %R **Analytes** [D] [C] <10.0 97 500 486 80-120 Chloride 91 Sulfate <10.0 500 453 80-120

Blank Spike Recovery [D] = 100*[C]/[B] All results are based on MDL and validated for QC purposes. BRL - Below Reporting Limit



# Form 3 - MS / MSD Recoveries



Project Name: Waterline Replacement Kickerillo Area

Work Order #: 465370 Project ID: 1140194601

**Lab Batch ID:** 916770 **QC- Sample ID:** 465370-001 S **Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 06/21/2013 **Date Prepared:** 06/20/2013 **Analyst:** RKO

### Reporting Units: mg/kg MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by SW 9056  Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	55.3	500	522	93	500	521	93	0	80-120	20	
Sulfate	<10.0	500	444	89	500	442	88	0	80-120	20	

Lab Batch ID: 916770 QC- Sample ID: 465370-011 S Batch #: 1 Matrix: Soil

Reporting Units: mg/kg MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by SW 9056  Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	41.8	500	501	92	500	504	92	1	80-120	20	
Sulfate	13.6	500	444	86	500	445	86	0	80-120	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B Relative Percent Difference RPD = 200*|(C-F)/(C+F)|



# **Sample Duplicate Recovery**



Project Name: Waterline Replacement Kickerillo Area

Work Order #: 465370

**Lab Batch #:** 916783 **Project ID:** 1140194601

 Date Analyzed:
 06/21/2013 09:43
 Date Prepared:
 06/21/2013
 Analyst:
 ANS

 QC- Sample ID:
 465370-001 D
 Batch #:
 1
 Matrix:
 Soil

Reporting Units: Ohm-cm	SAMPLE / SAMPLE DUPLICATE RECOVERY								
Soil Resistivity (As Received) by NACE  Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag				
Soil Resistivity	1480	1460	1	20					

**Lab Batch #:** 916718

 Date Analyzed:
 06/20/2013 14:52
 Date Prepared:
 06/20/2013
 Analyst: DHE

 QC- Sample ID:
 465370-010 D
 Batch #:
 1
 Matrix:
 Soil

Reporting Units: SU	SAMPLE /	SAMPLE / SAMPLE DUPLICATE RECOVE								
Soil pH by EPA 9045C	Parent Sample Result [A]	Sample Duplicate Result	RPD	Control Limits %RPD	Flag					
Analyte		[B]								
рН	9.15	9.17	0	20						

**Lab Batch #:** 916718

 Date Analyzed:
 06/20/2013 14:52
 Date Prepared:
 06/20/2013
 Analyst: DHE

 QC- Sample ID:
 465370-018 D
 Batch #:
 1
 Matrix: Soil

Reporting Units: SU	SAMPLE / SAMPLE DUPLICATE RECOVERY								
Soil pH by EPA 9045C  Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag				
рН	8.40	8.41	0	20					

Spike Relative Difference RPD 200 * | (B-A)/(B+A) | All Results are based on MDL and validated for QC purposes. BRL - Below Reporting Limit

	ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD
4143 Greenbriar Drive, Stafford, TX 77477 281-240-4200	☐ 9701 Harry Hines Blvd., Dallas, TX 75220 <b>214-902-0300</b>
13.14.14. II 5332, Blackberry Drive, San Antonio, TX 78238 <b>210-509-3334</b>	☐ 12600 West I-20 East, Odessa, TX 79765 432-563-1800 Serial #: 322260 Page of
y-City Phone	Lab Only:
OTEST ENGINEERING HOUSTON 713 2660588.	
Name-Location ☐ Previously done at XENCO Project ID	TAT: ASAP 5h 12h 24h (48h)3d 5d 7d 10d 21d Standard TAT is project specific.
lines, Replacement kickerillo Area. 1140194601	It is typically 5-7 Working Days for level II and 10+ Working days for level III and IV data.
sc. TN, UT Other  **TOTAL FE, GA, LA, MS, NC,   Proj. Manager (PM)	ALL dx2 CBs)
esults to ☐PM and ' ^{', '} Fax No:	App Pr
TO SICTEMENT CON	dx
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Matrix: Air (A), Product (P), Solid (S), Water (W); Liquid (L)

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# ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

Preservatives: Various (V), HCl pH<2 (H), HZSO4 pH<2 (S), HNO3 pH<2 (N), Asbc Acid&NaOH (A), ZnAc&NaOH (Z), (Cool, << ContSize: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (40), 1L (1), 500ml (5), Tedlar Bag (B), Various (V), Other	THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE P	3 XX	7	Relinquished by (Initials and	,	3-50	ر ت ش	0 1 0		P	1	3 2K 3	16 NB - 83	Sample ID	Sampler Name		Special DLs (GW DW QAPP	QAPP Per-Contract CLP	Reg Program: UST DRY	Quote/Pricing:	alts to	7 : 1	Project Name-Location	Company-City	
HCI pH<2 (H), H2, 32oz (32), 40m		<b>&gt;</b>	su .	and Sign)		グーレング	5-7-13	5-7-13	5-8-13	5-8-13	ふるう	5-8-13	かんり	Sampling Date			MDLs RLs	AGCEE NAVY	DRY-CLEAN Land-Fill		□PM and report to the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of			ZAZNARA	4143 Greenbriar Driv 5332, Blackberry Driv
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A), ZnAc&NaOt ıs (V), Other _			6.3											VOA; PP TCL	. D\ 8310	N /	Appd 8270	x-1	Арр		CALL Other	-	TAT: ASAP 5h It is typically 5-7	Lab Only:	9701 Harry Hines Blvd., Dallas, 12600 West I-20 East, Odessa,
H ( <b>Z</b> ), (Cool, <40			20-13 9.S	Date & Time		-								SVOCs: Full-Lis OC Pesticides Metals: RCRA-8 SPLP - TCLP	PCI	Bs CRA	Herb 4 P	icide b 13l	s C	23TAL	Pesticides Appdx 1 App	odx2	12h 24h (48 Working Da <b>y</b> s		
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Plastic (P), Various (V)	hie-abbioved is Heeded.	ried unless	ty of XENCO	C°C										Sample Clean-u	ups a		re-ap		ved a		eded From:	Remarks			シュリ

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Matrix: Air (A), Product (P), Solid (S), Water (W), Liquid (L)

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Page 15 of 16

Final 1.000



Work Order #: 465370

# XENCO Laboratories



Prelogin/Nonconformance Report- Sample Log-In

Client: Geotest Engineering, Inc.

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

**Date/ Time Received:** 06/20/2013 10:40:00 AM

**Temperature Measuring device used:** 

•	Sample Receipt Checklist		Comments
#1 *Temperature of cooler(s)?		20	
#2 *Shipping container in good condition?		Yes	
#3 *Samples received on ice?		No	
#4 *Custody Seals intact on shipping contai	ner/ cooler?	No	
#5 Custody Seals intact on sample bottles?		No	
#6 *Custody Seals Signed and dated?		No	
#7 *Chain of Custody present?		Yes	
#8 Sample instructions complete on Chain of	of Custody?	Yes	
#9 Any missing/extra samples?		No	
#10 Chain of Custody signed when relinquis	shed/ received?	Yes	
#11 Chain of Custody agrees with sample la	abel(s)?	Yes	
#12 Container label(s) legible and intact?		Yes	
#13 Sample matrix/ properties agree with C	hain of Custody?	Yes	
#14 Samples in proper container/ bottle?		Yes	
#15 Samples properly preserved?		N/A	
#16 Sample container(s) intact?		Yes	
#17 Sufficient sample amount for indicated	test(s)?	Yes	
#18 All samples received within hold time?		No	Samples received past recommended 28 Day hold time
#19 Subcontract of sample(s)?		N/A	
#20 VOC samples have zero headspace (le	ss than 1/4 inch bubble)?	N/A	
#21 <2 for all samples preserved with HNO3	3,HCL, H2SO4?	N/A	
#22 >10 for all samples preserved with NaA	sO2+NaOH, ZnAc+NaOH?	N/A	

Must be completed for after-he	ours delivery of samples	s prior to placing in the r	efrigerator

Analyst: TT	PH Device/Lot#:	
Checklist completed	d by:	Date: <u>06/20/2013</u>
Checklist reviewed	by: Summer Debbie Simmor	Date: <u>0</u> 6/20/2013